

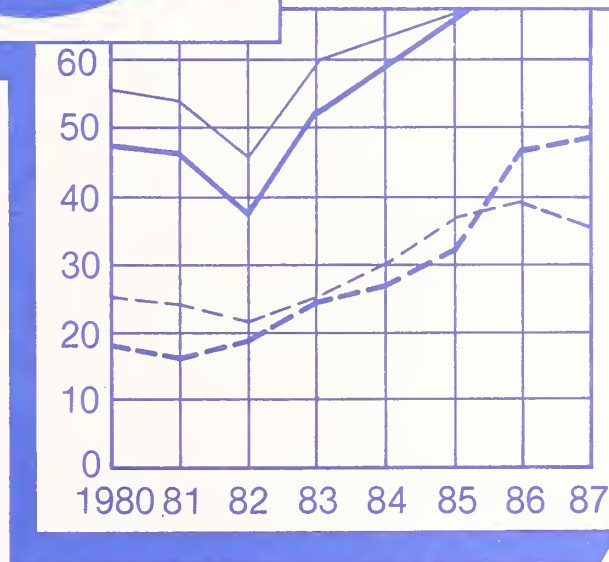
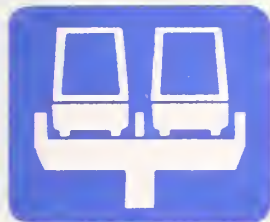
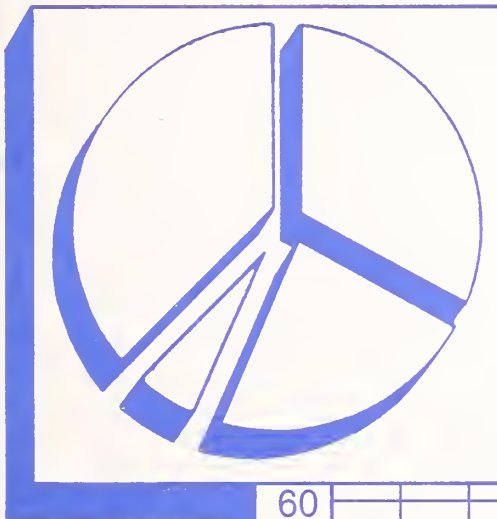


U.S. Department
of Transportation

Urban Mass
Transportation
Administration

Compendium of NATIONAL URBAN MASS TRANSPORTATION STATISTICS

from the 1987 Section 15 Report



UMTA Office of Grants Management

COMPENDIUM

OF

*NATIONAL URBAN MASS
TRANSPORTATION STATISTICS*

1987 REPORTING YEAR

SECTION 15 REPORTING SYSTEM

OCTOBER 1990

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16. Abstract <p>This report provides summary statistics on the finances and operations of the United States' public transit systems for the 1987 calendar year. These statistics were derived from the database developed through the Urban Mass Transportation Administration's Section 15 Reporting System. This report is intended to complement the <u>National Urban Mass Transportation Statistics: Section 15 Annual Report</u> issued by the Urban Mass Transportation Administration since 1980. That report contains aggregate transit statistics, but focuses principally on the finances and operations of individual transit systems. By contrast, the <u>Compendium</u> provides a national, policy-oriented perspective, highlighting aggregate financial and operational characteristics.</p> <p>In this report, national transit industry financial operational characteristics are illustrated through use of 1) graphics designed to emphasize key transit industry patterns, 2) policy relevant statistics and aggregations, and 3) trend information incorporating statistics from the Section 15 database 1983, 1984, 1985, 1986, and 1987. These characteristics are examined in three chapters: <u>Chapter I - Financial Statistics</u>; <u>Chapter II - Operational Statistics</u>; and <u>Chapter III - Performance Measures</u>. The report also includes an Introduction designed to acquaint readers with the statistics and alert them to issues affecting their use.</p>			
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PREFACE

The 1987 Compendium of National Urban Mass Transportation Statistics (the Compendium) was prepared by Materials, Communication & Computers, Inc. in association with Hickling Corporation, under contract #DTUM60-89-C-41008 with the U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA), Office of Grants Management. It furnishes a national, policy-oriented perspective on the finances, operations and performance of the U.S. public transportation industry. The Compendium complements the Section 15 Reporting System's annual publication, National Urban Mass Transportation Statistics (commonly known as the Section 15 Annual Report).

The Section 15 Annual Report focuses on individual transit system statistics. The Compendium takes an industry-wide view, emphasizing statistics and aggregations that are useful in policy setting. The Compendium grows out of an effort to construct a Section 15 microcomputer database that can be easily accessed by researchers, transit managers, and policy analysts. To create this database, information from the Section 15 data tapes, produced at the Transportation Systems Center, is tabulated using Lotus 1-2-3. The resulting formatted database can be used to conduct statistical analyses. The 1987 version of the database was used in developing this report. The Compendium also includes information from the Section 15 Annual Report ("Annual Report") of fiscal years 1983, 1984, 1985, 1986, and 1987.

The Compendium uses graphs extensively. Many users of the Annual Report have felt that the great volume of statistics and tables in the Annual Report obscures important patterns. The graphic representations included in the Compendium are intended to help the reader visualize those patterns and trends. Graphs and tables appear together, for quick interpretation of the information presented in the tables. In some cases, the graphs include all the information in the tables. In other cases, graphs trace only the more significant data items and patterns.



INTRODUCTION - UNDERSTANDING AND USING THIS REPORT

This is the sixth Compendium of National Urban Mass Transportation Statistics; the first, a prototype, was intended largely for use by UMTA staff. The second and third Compendium, which were distributed more widely, provided summary statistics on the finances and operations of U.S. public transit systems for calendar years 1983 and 1984. This Compendium generally follows the content and format of the 1986 Compendium and is, like it and the 1985 version, intended for national distribution.

The statistics were derived from a database developed through the Urban Mass Transportation's Section 15 Reporting System. The Compendium complements the National Urban Mass Transportation Statistics Section 15 Annual Report issued by the Urban Mass Transportation Administration since 1981 beginning with data from 1979. That report contains aggregate transit statistics, but focuses principally on the finances and operations of individual transit systems. By contrast, the Compendium provides a national, policy-oriented perspective highlighting aggregate financial and operational characteristics and trend information for key statistics and performance indicators. The level of accuracy of the data between the Annual Report and the Compendium is the same.

In this report, national transit industry financial and operational characteristics are illustrated through 1) graphic displays designed to show key transit industry patterns, 2) policy-relevant statistics and aggregations, and 3) trend information incorporating statistics from the Section 15 database for years 1983 through 1987.

Efforts have been made to present this information logically and consistently and to direct the reader's attention to key trends and patterns. Each chapter contains an introduction designed to help the reader interpret and use the statistics. Brief commentaries highlight salient patterns and trends revealed in the charts and tables. The report is also organized in a way that permits researchers and analysts to reference the Annual Report for more in-depth examinations of industry and transit agency statistics.

REPORT ORGANIZATION

The Compendium is organized into three chapters:

CHAPTER I - FINANCIAL STATISTICS - This chapter describes transit agency revenue sources and expenses, grouping this information according to fleet size and urbanized area population.

CHAPTER II - OPERATING STATISTICS - This chapter describes the scope and magnitude of public transit operations in terms of inputs (labor and vehicles) and outputs (services provided and public use of these services).

CHAPTER III - PERFORMANCE MEASURES - This chapter contains selected service performance measures. Indices of this type typically relate service output and use to service cost or other measures. These relationships can be used

to gain broad insights into the industry's efficiency and effectiveness in serving public transportation markets.

ORGANIZATION OF TABLES AND GRAPHS

The tables analyze transit system statistics according to system fleet size and according to urbanized area population size.

System size groups correspond to the transit agency aggregations used in the Section 15 Annual Report. Fleet size groups are based on the number of vehicles operated in maximum service. Maximum service is the revenue vehicle count taken during the reporter's maximum season of the year, on the week and day that the maximum occurs (but not if a special event or extreme set of circumstances fell on this day). It reflects a recurring maximum (or peak) service requirement. Productivity and performance measures relating to fleet size thus reflect regular peak service rather than fleet held for spares and other purposes. There are seven fleet sizes:

- o 1) less than 25 vehicles;
- o 2) 25-49 vehicles;
- o 3) 50-99 vehicles;
- o 4) 100-249 vehicles;
- o 5) 250-499 vehicles;
- o 6) 500-999 vehicles; and
- o 7) 1000 and more vehicles.

Depending on the specific table, the seven fleet size categories are applied in one of two ways. When a table describes system-wide characteristics, fleet size refers to all the vehicles in the fleet in every mode. When a table describes modal characteristics, fleet size refers to the number of vehicles of that particular mode only in the fleet.

The second type of classification, size of urbanized area, is used to furnish a policy perspective, reflecting the fact that the Section 9 block grant program, the principle source of Federal transit support, apportions funds to urbanized areas. Six urbanized area population sizes are employed in the report:

- o 1) 50,000-99,999;
- o 2) 100,000-199,999;
- o 3) 200,000-499,999;
- o 4) 500,000-999,999;
- o 5) 1,000,000-1,999,999; and
- o 6) 2,000,000 and over.

The financial and operational data in this report generally use the statistical classifications used in the Section 15 Annual Report. Transit revenues are classified by object class. Each class represents a specific type of revenue source and are reported by transit system totals and not by individual modes. Operating expenses are organized into object class and function categories and are reported by individual modes. The object classes (i.e., expense categories) define the kind of expenditure (labor, fringe benefits, materials, etc.) and the

function categories define the type of activity performed in incurring the expense (vehicle operations, vehicle maintenance, non-vehicle maintenance and general administration).

Operational statistics also are grouped in the same manner as in the Annual Report such as the number of vehicle miles, passenger miles, accidents, and employees.

In keeping with this document's national focus, the statistics in the Compendium have, in some cases, required combining two or more of the Section 15 object classes in order to focus more sharply on statistics of interest to policy analysts and researchers. When expense object classes have been combined, these aggregations are described in the chapter introductions.

DATA SOURCES AND ACCURACY

All public transit systems receiving Federal funds through the Section 9 block grant program are required to file an annual Section 15 report; other public and private transit systems may report but are not required to do so. The financial and operational information in Section 15 reports is the most comprehensive source of information on transit revenues, expenses and operations.

Before the information is entered into the database, each system's report is reviewed for inconsistencies and errors. This review identifies and resolves questions of data completeness and accuracy. UMTA must give final approval to a system's data before it can be entered into Section 15 database and Annual Report. UMTA can reject a transit system's report if the report is not in full compliance with reporting requirements or UMTA can choose not to enter any data item that seems unreliable. UMTA does not, however, change any reported data; all data changes are made by the transit system.

The review involves a series of range and reasonableness checks to screen questionable data. These procedures, referred to as the "data validation process," are central to efforts to create an accurate and reliable database. UMTA has sought to improve data validation procedures from the very outset of the Section 15 program through the development of more thorough, organized, and focused data screening procedures. Nevertheless, the limitations of range and reasonableness checks and the vast amount of information that must be validated make it likely that some errors will still find their way into the database. Inconsistencies stem from difficulties experienced by transit systems in obtaining accurate information and in interpreting certain reporting requirements. Those difficulties will be remedied as transit systems become more familiar with Section 15 reporting guidelines and as UMTA works to specify those guidelines more clearly.

CHANGES TO THE ANNUAL SECTION 15 DATABASE

This document contains trend information covering five Section 15 reporting years, 1983 through 1987. Certain changes in the Section 15 database during these five years affect the comparability of the information and the validity of the trends presented in this report. Although the original Section 15

reporting requirements have remained largely intact since the program's implementation, the quality of information in the database, the composition of the database itself, and the way in which the reported statistics are aggregated have changed.

Data Quality

Every year refinements in the data validation process have led to improvements in the reliability and consistency of Section 15 information. The degree of improvement is difficult to quantify, but clearly the databases are improving. However, there are still problems. For example, some transit systems have reported total vehicle miles and hours equal to vehicle revenue miles and hours (implying vehicles are always providing service to passengers and never deadhead). This reporting practice generally over reports revenue service. Secondly, some transit systems data for vehicle revenue miles, unlinked passenger trips, and passenger miles were recorded as zeros; this leads to some underreporting. We do not believe that these errors significantly affect the data presented in the Compendium, especially since the data are aggregated and presented in broad categories in most of the tables.

Database Composition

Changes in the composition of the Section 15 database, for the 1983 through 1987 report years, are easier to pinpoint. Between 1983 and 1987, the number of transit systems included in the Section 15 database increased from 432 to 451 (see Table I-1). This 4.2 percent increase is largely attributable to growth in the number of applications for Federal assistance, and the fact that transit systems now have a better understanding of Section 15 reporting requirements and therefore are more likely to have their reports incorporated into the annual database. Table I-2 lists the six major public transit modes and shows how many systems reported in each mode included in the Section 15 database for the 1983 through 1987 report years.

Table I-1
SECTION 15 DATABASE: SYSTEM COMPOSITION, 1983 to 1987

<i>Fiscal Year End</i>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
<i>Number of Systems</i>	435	438	453	432	451

TABLE I-2
SECTION 15 DATABASE: MODAL COMPOSITION, 1983 TO 1987

<i>Fiscal Year</i>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
<i>Motor Bus</i>	364	379	396	374	383
<i>Rapid Rail</i>	10	12	12	12	12
<i>Streetcar</i>	9	9	8	10	12
<i>Trolley Bus</i>	5	5	5	5	5
<i>Demand Response</i>	234	238	243	245	261
<i>Commuter Rail</i>	22	18	16	15	14

Perhaps the single greatest change in the composition of the Section 15 database was the addition of commuter rail services in 1983. UMTA had sought in previous years to collect commuter rail statistics and incorporate them into the database, but confusion about how and even whether Section 15 reporting requirements applied to commuter rail services limited the number of commuter rail reporters. Much of the confusion, however, was resolved with the establishment of Section 9 funding provisions that apportioned Federal funds on the basis of Section 15 operating statistics. Most commuter rail systems are now reporting regularly under the Section 15 program. In order to accommodate these new reporters, UMTA initially reduced Section 15 reporting requirements for commuter rail reporters. In the 1987 Compendium, complete commuter rail data are presented along with data for the other five modes.

Direct and Purchased Service Guidelines

The third change in the Section 15 database relates to the way in which purchased transportation statistics are reported and aggregated. Until the 1983 reporting year, Section 15 reporting procedures did not require that transit agencies list the full costs of providing purchased transportation, nor did they require that agencies allocate transit operating statistics between directly operated and purchased services. Reporting agencies were required simply to report the expense of purchasing transportation as a single line item and to report purchased transportation operating statistics, such as vehicle miles and passenger trips, as part of overall system operating statistics. Since the cost of purchasing transportation generally reflects contract costs only and not the full costs (such as contract administration, marketing and other costs provided by some municipalities) incurred in supplying the services, service costs were underrepresented and the relationships among service costs, service supply, and service use were misrepresented.

New purchase-of-service reporting guidelines have remedied these two interrelated problems. The guidelines require that 1) contract carriers using fifty or more vehicles to supply contract services must file a full Section 15 report, and 2) reporting agencies must distinguish between operating statistics for directly

operated services and for purchased services. The benefits of these guidelines are clear and evident in this report: more accurate representation of costs and a clearer picture of direct and purchased services. Nevertheless, it is important to recognize that the introduction of the guidelines affects the comparability of the statistics from year to year, notably the trend information in Chapter III, "Performance Measures."

Reporting Cycle

Starting with the 1983 report, UMTA changed to a calendar year reporting period, i.e., a reporting period that runs from January 1 to December 31. In previous reporting years, the Section 15 reporting system used a July 1 to June 30 reporting year. Thus, reports submitted, for example, by transit systems with fiscal years ending 30 September 1983 and 30 June 1983 would ordinarily be grouped into the 1983 database and the statistics from those reports would appear in the 1983 Annual Report. The calendar reporting period, by contrast, yields a somewhat different grouping of reports. Under it, all transit agencies whose fiscal year ends in the same calendar year (i.e. January 1 through December 31) are grouped into the same database and Annual Report. Thus, the 1983 database contains information from reports that cover fiscal years ending between January 1, 1983, and December 31, 1983, only.

The change to calendar year reporting was made to help end confusion between transit agencies' fiscal years and the Section 15 reporting year. It did not affect Section 15 reporting requirements, transit system fiscal years, or the types of data contained in the Section 15 reports submitted by transit systems. The change created a one time only 6-month transition period for transit systems with fiscal years ending on or between July 1, 1982 and December 31, 1982. The data from these systems were not published, but were stored in the computerized database. The data summarized in the 1987 Annual Report and Compendium are from transit system's fiscal years ending on or between January 1, 1987 and December 31, 1987.

CHAPTER I -- FINANCIAL STATISTICS

OVERVIEW

Chapter I examines transit industry revenue sources and operating expenses. Revenue information comes from the Section 15 200 series forms, while the expense information comes from 300 series forms. Only selected R ("Required") level information is used. For more detailed information on individual transit system revenues for fiscal year 1987, the reader is directed to Table 3.01 through Table 3.06 in the Annual Report. For detailed expense information, the reader is directed to Table 3.07 through Table 3.10.

Several common features in the graphs and tables are presented in this Chapter. All numbers are in percentages except for the second total, (marked \$ million, this is the second-to-the last row), which reflects total dollars and the row denoting the "Systems Reporting" (this is the last row). Thus to determine the actual dollar amount for a specific data item, you need only multiply the percentage by the total dollar amount presented in the same column. System-wide percentages and totals are presented on most charts and tables.

The financial data in this chapter are aggregated according to fleet size and urbanized area size. Both the revenue and expense information are categorized by fleet size. Urbanized area size categories groupings, by contrast, are applied to revenue source breakdowns only, reflecting the fact that UMTA transit assistance programs apportion monies to urbanized areas, not individual transit systems. The revenue tables and charts offer policy analysts a clearer picture of the impacts of funding decisions and of the relationship between Federal, state, and local assistance and other revenue sources.

TRANSIT SYSTEM REVENUES

Under Section 15 reporting guidelines, transit systems report their revenues by source across the entire system not by mode. In the Compendium, system-wide totals are aggregated in urbanized area and system fleet size peer groups, and are examined from the perspective of two time periods: 1) the 1987 reporting year and 2) the 1983 through 1987 reporting years. Tables and charts for 1987 supply a "snapshot" of transit agency and urbanized revenue sources for the most recent year covered in the Section 15 database. Those covering five fiscal years point up revenue source trends for the entire industry.

Transit Operating Revenue

To best describe the sources of transit industry operating revenue, the ten revenue source categories in the Section 15 Report are collapsed into seven categories. The seven revenue source categories (and their relationship to the categories in the Annual Report) are as follows:

- o Passenger Fares - This category corresponds directly to the Annual Report's Passenger Fare and Other Transportation Revenue.

- o System Generated - This category corresponds to the Annual Report's Non-transportation Revenue.
- o Local Assistance - This category includes the Annual Report's Local Cash Grants and Reimbursements and Local Special Fare Assistance.
- o State Assistance - This category includes the Annual Report's State Cash Grants and Reimbursements and State Special Fare Assistance.
- o Federal Assistance - This category corresponds directly to the Annual Report's Federal Cash Grants and Reimbursements.
- o Taxes Levied by Transit Systems - This category corresponds directly to the Annual Report's Taxes Levied by Transit System category.
- o Miscellaneous - This category corresponds directly to the Annual Report's Other Revenue.

Transit Capital and Operating Assistance

For the same reason, the categories describing capital assistance and operating assistance sources are also aggregations of the categories employed in the Annual Report. Here capital and operating assistance are both defined under five general categories:

- o Federal Assistance - For operating assistance, this category includes the Annual Report's Section 5, Section 9 and Other Federal Funds. For capital assistance, it includes UMTA Section 3 and Section 5 and 9 programs and other UMTA, DOT and Federal sources.
- o State General Revenue - These funds are appropriated by the state out of its general revenue funds.
- o State Dedicated Revenue - For operating assistance and capital assistance, this category includes dedicated funds from taxes, tolls and other sources.
- o Local General Revenue - These funds are appropriated by the locality out of its general revenue funds.
- o Local Dedicated Revenue - For operating assistance and capital assistance, this category includes dedicated funds from taxes, tolls and other sources.

TRANSIT SYSTEM OPERATING EXPENSES

In the Section 15 reporting system, operating expenses are reported by mode. In each mode, expenses are jointly allocated among functional categories and object class categories. Functional categories are the general operational areas in which expenses are incurred, including Vehicle Operations, Vehicle

Maintenance, Non-Vehicle Maintenance, and General Administration. Object classes categories are the purposes for which the expenditure was made, such as labor, supplies, or fringe benefits. Thus, the direct labor expense for a maintenance mechanic repairing a vehicle would be recorded within the expense object class "labor" and under the function class "vehicle maintenance" .

Seven object class categories are employed in the statistical tables in this report. These categories represent an aggregation of the fourteen Required Level object classes utilized in the Section 15 Annual Report. The seven object class categories include:

- o Labor - This category includes the Annual Report's Operator Salaries and Wages and Other Salaries and Wages.
- o Fringes - This category corresponds directly to the Annual Report's Fringe Benefits.
- o Services - This category corresponds directly to the Annual Report's Services object class.
- o Materials - This category includes the Annual Report's Fuel & Lubricants, Tires & Tubes, and Other Materials & Supplies.
- o Utilities - This category corresponds to the Annual Report's Utilities.
- o Purchased Transportation - This category combines the Annual Report's Purchased Transportation object class for services involving fifty or fewer vehicles with the Purchased Transportation object class for services involving more than fifty vehicles.
- o Miscellaneous - This category includes the Annual Report's Casualty & Liability Expense, and Other Expense.

Together, the tables and charts in this report present expense object class breakdowns for six major public transit modes: Motor Bus, Rapid Rail, Streetcar, Trolley Bus, Commuter Rail, and Demand Response. As pointed out in the introductory chapter, for 1983, the Section 15 system added commuter rail with lower reporting requirements than the other modes. The figures for 1983 do not therefore offer the same level of financial detail for commuter rail. Greater detail, including an allocation of commuter rail expenses according to object class and function, are available for 1984 through 1987.

Overall expenses are slightly understated for two reasons. First, for any given mode, total object class expenses do not include joint modal expenses reported by multi-modal transit systems; these operating expenses are not solely attributable to a single mode. In the Annual Report, joint expenses are summarized without respect to mode in a separate table. No attempt, however, has been made to allocate joint expenses among object classes.

Second, reconciling items (e.g., interest expenses, depreciation, leases and rentals) are excluded from operating expenses. Section 15 does not require that

these expenses be disaggregated by mode. It is therefore not possible to allocate these expenses by mode. This exclusion does not undermine the usefulness of the data presented here. Indeed, analysts using Section 15 data typically remove reconciling items from operating costs. Reconciling items are fundamentally incomparable because of the diversity of accounting practices used to handle such expenses.

PATTERNS AND TRENDS

Below are descriptions of some of the key financial patterns revealed in the tables and charts in this chapter.

Transit System Revenues

- o Passenger fares, which were 36.3 percent of total system operating revenues in 1987, represented the largest single source of operating revenues for transit systems. Passenger fares generated \$3.16 billion for the ten largest transit systems in 1987.
- o Generally, local (dedicated and general) assistance was the second largest source of operating revenue. State and local governments furnished the bulk of transit subsidies, together providing 44.7 percent of the transit system revenues in 1987. About forty percent of state and local revenues were dedicated revenues; the balance were general funds.
- o In general, smaller transit systems tended to rely more on Federal assistance. In 1987 Federal funds represented 18.1 percent of the operating revenue for transit systems with 25 to 49 vehicles and only 5.1 percent of the operating revenue for transit systems with 1,000 or more vehicles. Overall Federal funds provided 5.9 percent of transit operating revenue in 1987.
- o Between 1983 and 1987 the following changes occurred in funding sources for transit operating assistance:
 - Federal operating assistance declined by \$92.2 million, an average 2.4 percent per year.
 - State operating assistance increased by 34.2 percent (from \$1,829.8 million to \$2,454.8 million). This was an average increase in state operating assistance of 7.6 percent per year. State general assistance increased from \$1,188.0 million to \$1,648.0 million (38.7 percent or 8.5 percent per year) and state dedicated assistance increased from \$641.7 million to \$806.8 million (25.7 percent or 5.9 percent per year).
 - Local operating assistance more increased by 42.8 percent (from \$2,471.5 million to \$3,530.54 million). This was an average increase in local operating assistance of 9.3 percent per year. Local general assistance increased from \$1,325.9 million to \$2,041.0 million (53.9

percent or 11.4 percent per year) and local dedicated assistance increased from \$1,145.6 million to \$1,489.4 million (30.0 percent or 6.8 percent per year).

- o Total percentage of Federal capital assistance (from all Federal sources) declined from 70.3 percent to 69.6, total dollars decreased from about \$2.7 billion to about \$2.4 billion (\$335.0 million) between 1986 and 1987.
- o State and local revenues represented 30.5 percent of the total capital assistance for transit in 1987. About 41 percent of these revenues were dedicated and 69 percent were general funds.
- o The \$2.4 billion in Federal revenues applied to transit capital projects in 1987 were distributed as follows:
 - 1.7 billion (70.0 percent) was used by transit systems in urbanized areas with 2 million or more residents.
 - 444.9 million (18.9 percent) was used by transit systems in urbanized areas with between 1 and 2 million residents.
 - 200.7 million (8.5 percent) was used by transit systems in urbanized areas with between 200,000 and 1,000,000 residents.
 - 63.7 million (2.7 percent) was used by transit systems in urbanized areas with less than 200,000 residents.

Transit System Expenses

- o Public transit systems incurred operating expenses of approximately \$12.2 billion in 1987 distributed as follows:
 - 76.3 percent of operating expenses were incurred by transit systems in urbanized areas with 2 million or more residents.
 - 13.5 percent of operating expenses were incurred by transit systems in urbanized areas with between 1 and 2 million residents.
 - 7.4 percent of operating expenses were incurred by transit systems in urbanized areas with between 200,000 and 1,000,000 residents.
 - 2.8 percent of operating expenses were incurred by transit systems in urbanized areas with less than 200,000 residents.
- o Vehicle operations, the most labor-intensive function, generally represented the greatest expenses for all modes of public transportation. The one exception is rapid rail.
- o Motor bus vehicle operations constituted 54.2 percent of total expense while rapid rail vehicle operations were only 26.7 percent.
- o Overall, vehicle maintenance expense represented about 21 percent of total

transit system operating expenses. For the fixed route modes, this function generally represented the second highest percentage of expenses with between 18 and 28 percent of total operating expenses.

- o General administration expenses as a percent of total expenses were highest for rapid rail (31.9 percent).
- o Purchased transportation was used extensively to obtain demand response services. (About 56 percent of the expenses for these services were incurred through purchased services.) Commuter rail was the second most likely transit service to be obtained through a purchase of service arrangement. (4.3 percent of the expenses for these services was incurred through purchased services.) The other transit modes were infrequently obtained through purchased services.
- o Together labor and fringe benefit costs (\$8.89 billion) were 73 percent of transit system operating expenses in 1987. These expenses accounted for 58.0 percent of transit system operating costs in the smallest transit systems and 77.1 percent in the largest systems.

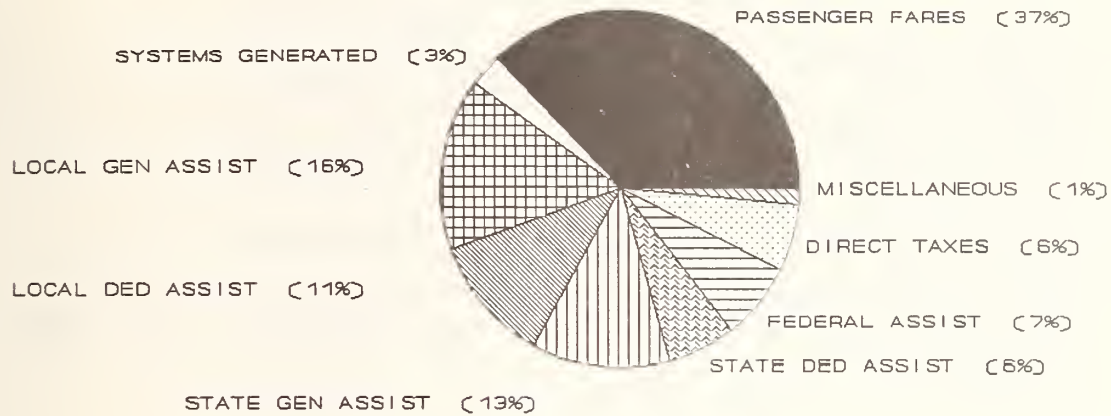
I. TRANSIT INDUSTRY FINANCES



A. TRANSIT INDUSTRY REVENUE SOURCES

- o Passenger fares, which were 36.3 percent of total system operating revenues in 1987, represented the largest single source of operating revenues for transit systems. Passenger fares generated \$3.16 billion for the ten largest transit systems in 1987.
- o Generally, local (dedicated and general) assistance was the second largest source of operating revenue. State and local governments furnished the bulk of transit subsidies, together providing 44.7 percent of the transit system revenues in 1987. About forty percent of state and local revenues were dedicated revenues; the balance were general funds.
- o Direct taxes (i.e. taxes levied directly by a transit authority) were not a widely used source of revenue for the majority of transit systems. Transit systems that range in size from 100 to 1000 vehicles in maximum service (about 22 percent of the systems) used this source more than the other transit systems.
- o In general, smaller transit systems tended to rely more on Federal assistance. In 1987 Federal funds represented 18.1 percent of the operating revenue for transit systems with 25 to 49 vehicles and only 5.1 percent of the operating revenue for transit systems with 1,000 or more vehicles. Overall Federal funds provided 5.9 percent of transit operating revenue in 1987.

SOURCES OF TRANSIT OPERATING REVENUE
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

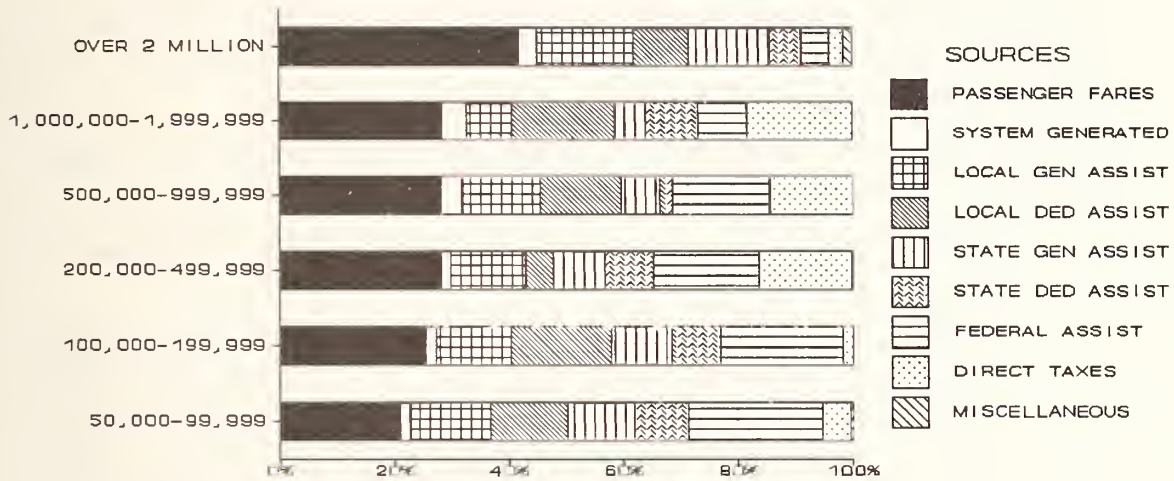


SOURCES OF TRANSIT OPERATING REVENUE
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
PASSENGER FARES	11.7%	24.8%	35.7%	38.0%	33.1%	35.6%	44.3%	36.3%
SYSTEM GENERATED	0.4%	1.4%	1.4%	2.8%	4.5%	5.1%	2.9%	3.1%
LOCAL GENERAL ASSISTANCE	18.4%	23.6%	12.3%	7.1%	7.0%	16.3%	17.6%	15.3%
LOCAL DEDICATED ASSISTANCE	26.1%	11.3%	12.5%	11.1%	16.2%	16.2%	6.8%	11.1%
STATE GENERAL ASSISTANCE	11.4%	9.1%	6.4%	6.0%	7.1%	0.4%	18.1%	12.3%
STATE DEDICATED ASSISTANCE	23.1%	8.5%	12.4%	4.5%	11.7%	8.2%	1.8%	6.0%
FEDERAL ASSISTANCE	8.5%	18.1%	15.7%	8.3%	8.6%	5.8%	5.1%	6.8%
DIRECT TAXES	0.4%	3.0%	3.3%	21.1%	11.7%	12.3%	1.4%	5.9%
MISCELLANEOUS	0.1%	0.1%	0.1%	1.2%	0.0%	0.1%	1.9%	1.2%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$873.4	\$358.9	\$444.0	\$1,198.2	\$1,651.4	\$1,728.9	\$7,128.9	\$13,383.5
SYSTEMS REPORTING	194	88	58	57	26	14	10	447

- o In 1987, passenger fares represented between 20.9 and 41.8 percent of operating revenue for U.S. transit systems. Transit systems in smaller urbanized areas derived a smaller portion of their revenues from passenger fares than transit systems in larger urbanized areas.
- o Local general and dedicated assistance plus direct taxes generally exceeded the operating revenues generated for transit systems by passenger fares. Consequently, revenues generated by passengers or provided by local communities and transit systems represented between 53.3 and 72.7 percent of transit system operating revenues in 1987.
- o State general and dedicated assistance represented 18.3 percent of transit system operating revenue overall. Although most urbanized areas received between 14.6 and 21.0 percent of their transit operating revenues from state assistance in 1987, transit systems in urbanized areas with populations between 500,000 and 999,999 received only 8.9 percent of their operating revenues from state funds.
- o Federal operating assistance typically constituted a larger share of operating revenues for transit systems in smaller urbanized areas than for systems in larger urbanized area. More specifically, in 1987 Federal assistance represented between 4.8 and 8.5 percent of the operating revenue of transit systems in urbanized areas with 1 million or more residents and between 17.0 and 23.4 percent of the operating revenue for transit systems in urbanized areas with less than 1 million residents.

SOURCES OF TRANSIT OPERATING REVENUE
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987



SOURCES OF TRANSIT OPERATING REVENUE
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987

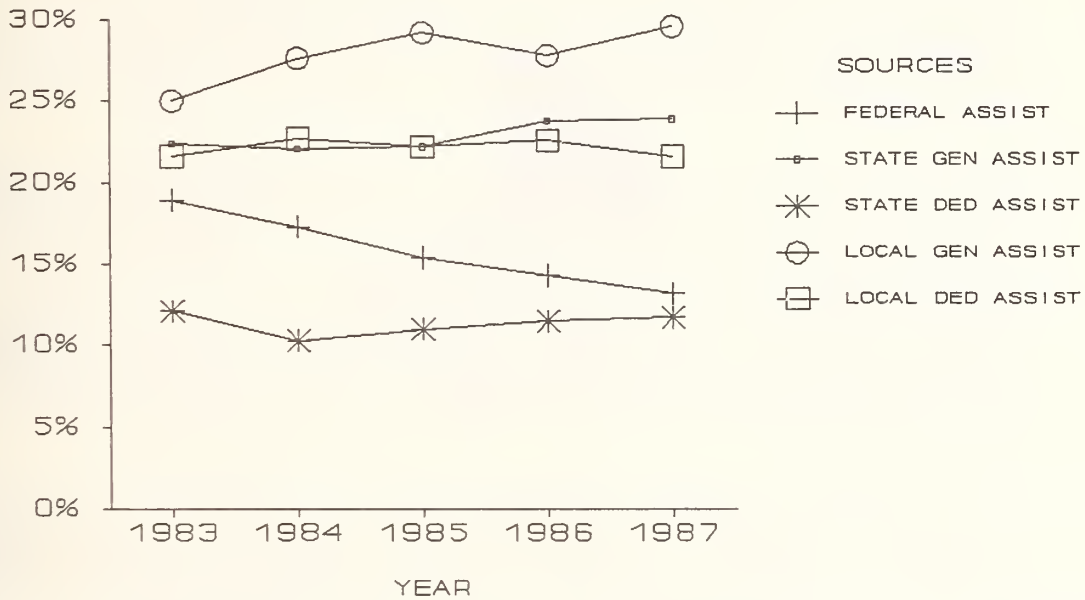
POPULATION -->	50,000	100,000	200,000	500,000	1 MILLION	OVER 2 MILLION	TOTAL
	TO 99,999	TO 199,999	TO 499,999	TO 999,999	TO 1,999,999		
PASSENGER FARES	20.9%	25.3%	28.0%	28.0%	28.3%	41.8%	38.3%
SYSTEM GENERATED	1.8%	1.9%	1.6%	3.8%	4.3%	3.0%	3.1%
LOCAL GENERAL ASSISTANCE	13.9%	13.1%	13.1%	13.6%	7.9%	17.0%	15.3%
LOCAL DEDICATED ASSISTANCE	13.6%	17.5%	4.9%	14.2%	18.0%	9.7%	11.1%
STATE GENERAL ASSISTANCE	11.7%	10.5%	9.0%	6.7%	5.3%	14.2%	12.3%
STATE DEDICATED ASSISTANCE	9.3%	8.5%	8.4%	2.2%	9.3%	5.4%	6.0%
FEDERAL ASSISTANCE	23.4%	21.4%	18.5%	17.0%	8.5%	4.8%	6.8%
DIRECT TAXES	4.9%	1.8%	16.2%	14.5%	18.5%	2.6%	5.9%
MISCELLANEOUS	0.6%	0.1%	0.2%	0.0%	0.0%	1.5%	1.2%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$123.3	\$253.9	\$470.1	\$540.5	\$1,986.2	\$10,008.9	\$13,383.5
SYSTEMS REPORTING	106	88	78	32	48	94	446

- o Total expenditures for transit operating assistance increased by \$1,591.7 million between 1983 and 1987, from \$5,303.7 million to \$6,895.4 million. This represents an average increase of 6.8 percent per year.
- o Between 1983 and 1987 the following changes occurred in funding sources for transit operating assistance:
 - Federal operating assistance declined by \$92.2 million, an average 2.4 percent per year.
 - State operating assistance increased by 34.2 percent (from \$1,829.8 million to \$2,454.8 million). This was an average increase in state operating assistance of 7.6 percent per year. State general assistance increased from \$1,188.0 million to \$1,648.0 million (38.7 percent or 8.5 percent per year) and state dedicated assistance increased from \$641.7 million to \$806.8 million (25.7 percent or 5.9 percent per year).
 - Local operating assistance increased by 42.8 percent (from \$2,471.5 million to \$3,530.54 million). This was an average increase in local operating assistance of 9.3 percent per year. Local general assistance increased from \$1,325.9 million to \$2,041.0 million (53.9 percent or 11.4 percent per year) and local dedicated assistance increased from \$1,145.6 million to \$1,489.4 million (30.0 percent or 6.8 percent per year).
- o Local (general and dedicated) assistance together were the largest source of operating assistance for public transit systems during 1983 through 1987. These revenues have increased from 46.6 percent to 51.2 percent of the total assistance received by public transit systems.

SOURCES OF PUBLIC OPERATING ASSISTANCE

SECTION 15 -- 1983 - 1987

PERCENT OF ASSISTANCE

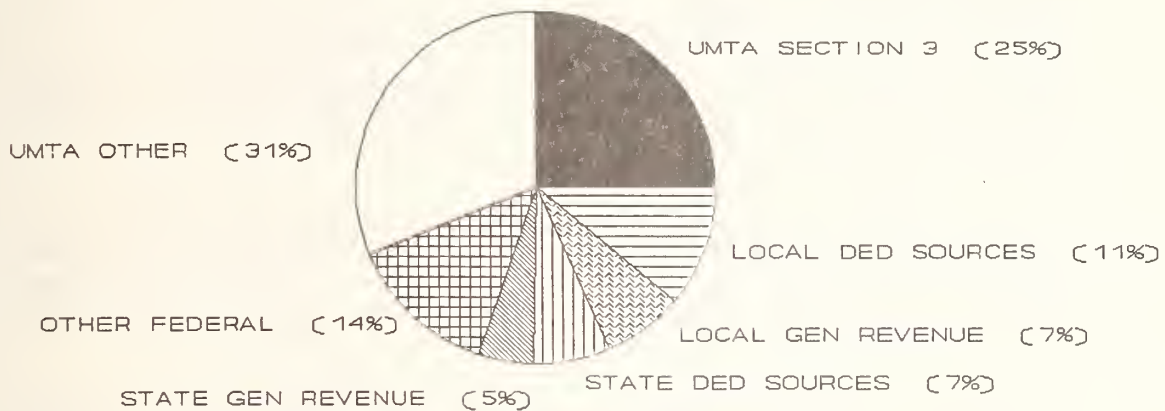


SOURCES OF PUBLIC OPERATING ASSISTANCE
SECTION 15 1983-1987

	1983	1984	1985	1986	1987
FEDERAL ASSISTANCE	18.9%	17.3%	15.4%	14.3%	13.2%
STATE GENERAL ASSISTANCE	22.4%	22.1%	22.2%	23.8%	23.9%
STATE DEDICATED ASSISTANCE	12.1%	10.3%	11.0%	11.5%	11.7%
LOCAL GENERAL ASSISTANCE	25.0%	27.6%	29.2%	27.8%	29.6%
LOCAL DEDICATED ASSISTANCE	21.6%	22.7%	22.2%	22.6%	21.6%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$5,303.7	\$5,383.5	\$5,916.9	\$6,217.3	\$6,895.4

- o Total percentage of Federal capital assistance (from all Federal sources) declined from 70.3 percent to 69.6, total dollars decreased from about \$2.7 billion to about \$2.4 billion (\$335.0 million) between 1986 and 1987.
- o Generally transit systems in all size groups received less capital assistance in 1987 than in 1986, except for transit systems with between 25-49 vehicles and those with over 1000 vehicles receiving more capital assistance of \$27.1 million and \$65.3 million respectively.
- o There was an overall decrease in capital assistance of \$442.8 million, the most significant decrease occurred in the 23 transit systems with between 250 and 500 vehicles. In 1987 they received \$297.0 million less in capital assistance from \$834.7 million in 1986 to \$537.7 million in 1987. However, in 1986 this group of transit systems had the most significant increase in capital assistance and in 1987 still maintained their number two position of capital assistance received behind transit systems with 1000 and more vehicles.
- o Other transit systems reporting the large declines in capital assistance between 1986 and 1987 were systems with 500 to 999 vehicles. In 1986, 14 transit systems reported receiving \$500.6 million; in 1987, 13 systems reported receiving \$405.3 million.
- o The nine largest transit systems in the U.S. received \$1,848.2 million (54.5 percent) of the total capital assistance in 1987. Seventy-four percent (\$1,369.5 million) of these revenues were from Federal sources.
- o State and local revenues represented 30.5 percent of the total capital assistance for transit in 1987. About 41 percent of these revenues were dedicated and 69 percent were general funds.
- o Local capital general assistance increased by \$22.2 million between 1986 and 1987 while local dedicated capital assistance also increased from \$299.0 million (7.8 percent of total capital revenues in 1986) to \$383.1 million (11.3 percent of total capital revenue in 1987), an increase of 84.1 million.
- o State capital assistance decreased by \$210.8 million between 1986 and 1987. This overall decrease resulted when state general capital assistance decreased by \$198.9 million and state dedicated capital assistance decreased by \$11.9 million.

SOURCES OF PUBLIC CAPITAL ASSISTANCE
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

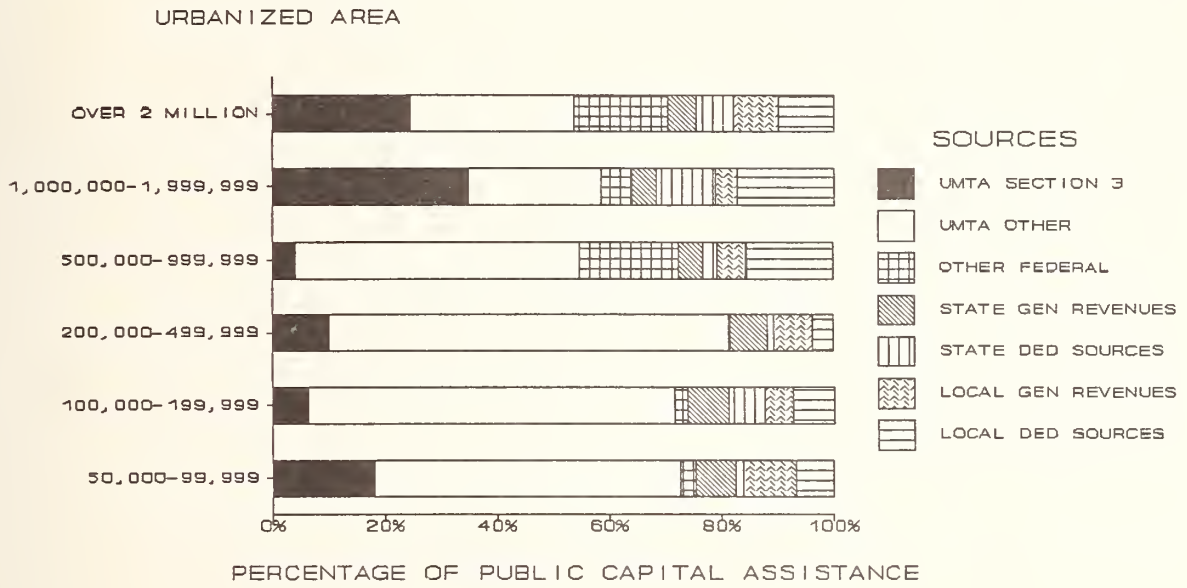


SOURCES OF PUBLIC CAPITAL ASSISTANCE
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
UMTA SECTION 3	23.2%	9.4%	4.3%	11.2%	27.1%	24.1%	27.4%	24.9%
UMTA SECTION 5, 9a and/or 9	31.9%	61.7%	64.8%	48.3%	37.9%	27.5%	25.7%	31.1%
OTHER FEDERAL	1.2%	1.1%	8.0%	13.8%	0.3%	9.1%	21.1%	13.6%
STATE GENERAL REVENUE	11.2%	9.2%	5.0%	4.1%	2.8%	2.5%	5.3%	5.1%
STATE DEDICATED SOURCES	12.2%	2.6%	6.7%	4.2%	10.7%	7.1%	5.4%	7.0%
LOCAL GENERAL REVENUE	1.2%	6.7%	5.6%	3.9%	2.9%	5.6%	9.9%	7.1%
LOCAL DEDICATED SOURCES	19.0%	9.3%	5.6%	14.6%	18.3%	24.0%	5.4%	11.3%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$296.6	\$60.6	\$93.5	\$148.8	\$537.7	\$405.3	\$1,848.2	\$3,390.6
SYSTEMS REPORTING	164	78	50	51	23	13	9	388

- o Total transit capital revenues were greatest in the largest urbanized areas. Areas with 2 million or more residents received \$2.3 billion (i.e. 69.2 percent) of total capital revenues in 1987. Urbanized areas with between 1 and 2 million residents received \$695.2 million (i.e. 20.5 percent) of the total capital revenues. All other urbanized areas together received \$349.9 million (10.3 percent) of total capital revenues in 1987.
- o For all urbanized area groups, Federal assistance constituted the major source of capital funding, accounting for between 64.0 percent of total capital revenues (in urbanized areas with between 1 and 2 million residents) and 81.6 percent of total capital revenues (in urbanized areas with 250,000 to 500,000 residents).
- o The \$2.4 billion in Federal revenues applied to transit capital projects in 1987 were distributed as follows:
 - \$1.7 billion (70.0 percent) was used by transit systems in urbanized areas with 2 million or more residents.
 - \$444.9 million (18.9 percent) was used by transit systems in urbanized areas with between 1 and 2 million residents.
 - \$200.7 million (8.5 percent) was used by transit systems in urbanized areas with between 200,000 and 1,000,000 residents.
 - \$63.7 million (2.7 percent) was used by transit systems in urbanized areas with less than 200,000 residents.
- o Between 1986 and 1987 Federal capital funding significantly decreased in urbanized areas with between 1 and 2 million residents by \$348.5 million, from \$793.4 to \$444.9 million. Federal capital funding decreased in the largest urbanized areas by \$12.5 million from \$1.66 to \$1.65 billion.

SOURCES OF PUBLIC CAPITAL ASSISTANCE
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987



SOURCES OF PUBLIC CAPITAL ASSISTANCE
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987

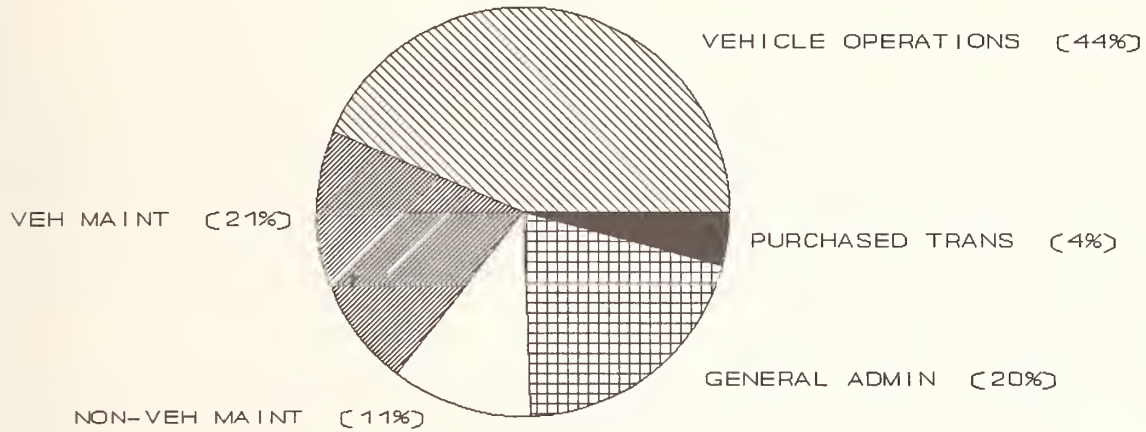
POPULATION -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	ALL SYSTEMS
UMTA SECTION 3	18.1%	6.3%	10.1%	4.1%	34.8%	24.6%	24.9%
UMTA SECTION 5, 9a, AND/OR 9	54.4%	65.3%	71.3%	50.6%	23.8%	29.1%	31.1%
OTHER FEDERAL	2.9%	2.4%	0.2%	17.6%	5.4%	16.7%	13.6%
STATE GENERAL REVENUES	7.0%	7.2%	6.5%	4.5%	4.4%	5.2%	5.1%
STATE DEDICATED SOURCES	1.4%	6.5%	1.3%	2.4%	10.5%	6.6%	7.0%
LOCAL GENERATED REVENUES	9.5%	5.0%	6.9%	5.2%	4.0%	8.1%	7.1%
LOCAL DEDICATED SOURCES	6.7%	7.4%	3.7%	15.6%	17.2%	9.8%	11.3%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$31.3	\$54.1	\$101.7	\$162.8	\$695.2	\$2,345.9	\$3,390.9



**B. TRANSIT INDUSTRY AND MODAL
OPERATING EXPENSES**

- o Vehicle operations, the most labor-intensive function, generally represented the greatest expenses for all modes of public transportation. The one exception is rapid rail, where general administration represented the highest proportion of operating expenses, 31.9 percent. Motor bus vehicle operations constituted 54.2 percent of total expense while rapid rail vehicle operations were only 26.7 percent.
- o Overall, vehicle maintenance expense represented about 21 percent of total transit system operating expenses. For the fixed route modes, this function generally represented the second highest percentage of expenses with between 18 and 28 percent of total operating expenses.
- o The non-vehicle maintenance proportion of total expenditures was higher for fixed guideway systems; it was highest for rapid rail, at 23.3 percent, next highest for streetcar, at 20.2 percent and next highest for commuter rail, at 20.0 percent. Motor bus and demand response, two non-rail modes, reported 3.4 and 0.6 percent respectively for non-vehicle maintenance.
- o General administration expenses as a percent of total expenses were highest for rapid rail (31.9 percent) and lowest for demand response (-13.7 percent).
- o Purchased transportation was used extensively to obtain demand response services. (About 56 percent of the expenses for these services were incurred through purchased services.) Commuter rail was the second most likely transit service to be obtained through a purchase of service arrangement. (4.3 percent of the expenses for these services was incurred through purchased services.) The other transit modes were infrequently obtained through purchased services.

TRANSIT OPERATING EXPENSES BY FUNCTION
BY MODE
SECTION 15 1987

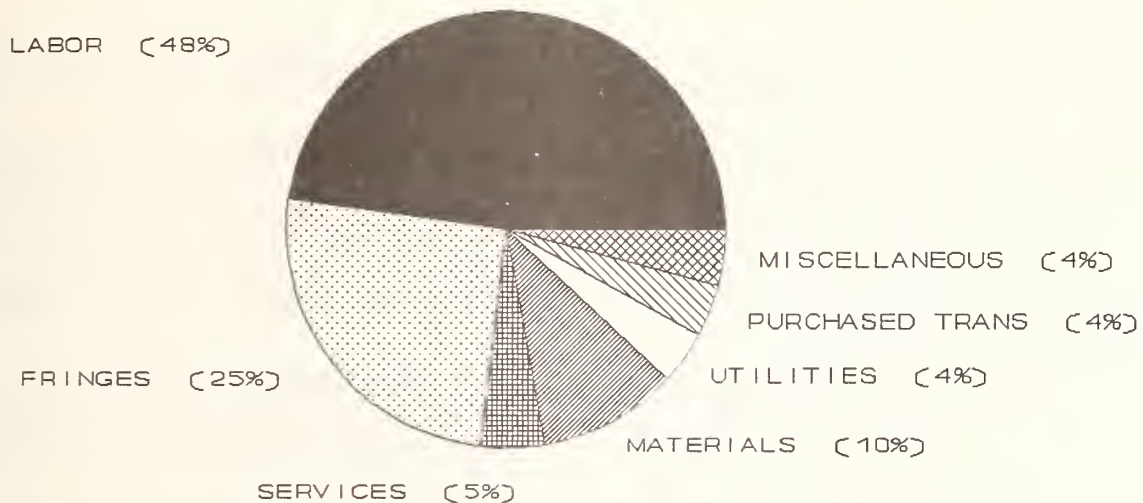


TRANSIT OPERATING EXPENSES BY FUNCTION
BY MODE
SECTION 15 1987

MODE -->	MOTOR BUS	RAPID RAIL	STREET CAR	TROLLEY BUS	COMMUTER RAIL	DEMAND RESPONSE	ALL SYSTEMS
VEHICLE OPERATIONS	54.2%	26.7%	35.0%	55.7%	34.8%	50.4%	43.7%
VEHICLE MAINTENANCE	21.6%	18.0%	27.6%	20.6%	24.1%	6.7%	20.8%
NON-VEHICLE MAINTENANCE	3.4%	23.3%	20.2%	8.3%	20.0%	0.6%	11.2%
GENERAL ADMINISTRATION	17.2%	31.9%	17.1%	15.4%	16.7%	-13.7%	20.3%
PURCHASED TRANS	3.3%	0.0%	0.0%	0.0%	4.3%	56.1%	4.0%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$6,606.4	\$3,232.3	\$171.6	\$97.5	\$1,650.7	\$206.7	\$12,175.4
SYSTEMS REPORTING	381	12	12	5	14	259	443

- o Labor expenses were the largest single operating expense for transit systems, representing between 38.7 and 49.5 percent of total expenses. The proportion of total operating expenses represented by labor expenses varied among the different transit system size groups, with the two groups that include the largest transit systems expending the most on labor related expenses (49.5 percent and 48.8 percent, respectively).
- o Fringe benefit expenses ranged from 13.1 percent to 28.3 percent of total transit system operating expenses. These expenses increased (as a percentage of total system expense) with transit system size.
- o Together labor and fringe benefit costs (\$8.89 billion) were 73 percent of transit system operating expenses in 1987. These expenses accounted for 58.0 percent of transit system operating costs in the smallest transit systems and 77.1 percent in the largest systems.
- o Public transit systems with more than 1,000 vehicles, including commuter rail service, accounted for 55.2 percent of all transit operating expenses in 1987.
- o Purchased transportation increased from 3.7 percent of total transit system operating expenses in 1986 to 4.0 percent of total operating expenses in 1987. Total expenditures for purchased transportation increased from \$434.8 million in 1986 to \$487.0 million in 1987.

TRANSIT OPERATING EXPENSES BY OBJECT CLASS
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

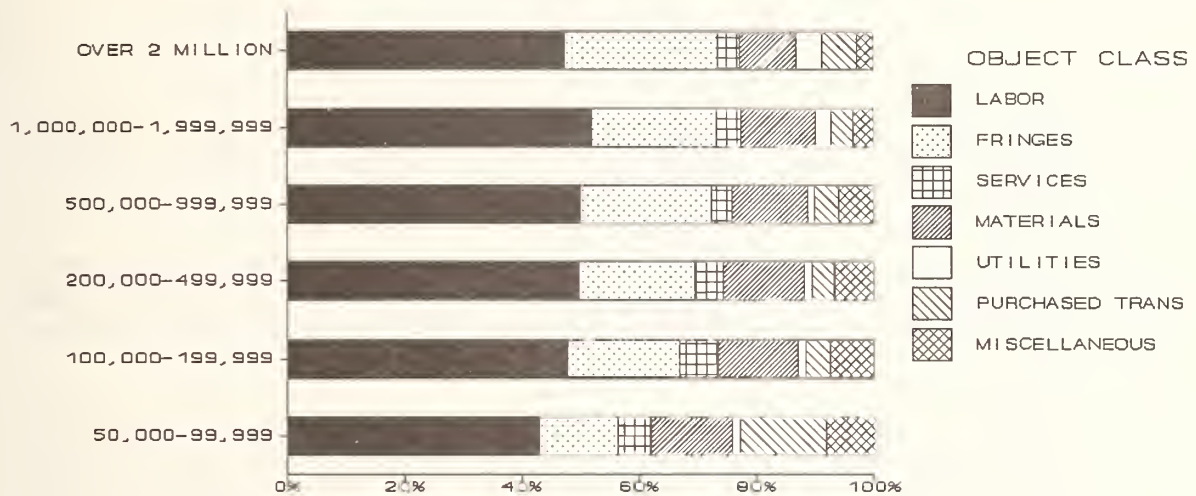


TRANSIT OPERATING EXPENSES BY OBJECT CLASS
ALL SYSTEMS BY FLEET SIZE
SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
LABOR	44.9%	38.7%	46.7%	47.2%	44.2%	49.5%	48.8%	47.8%
FRINGES	13.1%	15.7%	18.2%	19.8%	22.6%	23.9%	28.3%	25.2%
SERVICES	6.3%	6.0%	5.4%	4.7%	6.4%	5.4%	3.7%	4.6%
MATERIALS	14.6%	11.9%	12.1%	11.6%	10.3%	10.5%	9.9%	10.3%
UTILITIES	1.9%	2.2%	2.0%	1.4%	2.9%	3.6%	5.1%	4.0%
PURCHASED TRANSPORTATION	10.1%	16.8%	5.6%	6.0%	8.1%	3.7%	1.9%	4.0%
MISCELLANEOUS	9.0%	8.9%	10.0%	9.3%	5.5%	3.4%	2.4%	4.0%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$266.6	\$325.8	\$407.7	\$1,081.4	\$1,529.9	\$1,845.6	\$6,718.5	\$12,175.4
SYSTEMS REPORTING	189	88	58	58	26	14	10	443

- o Public transit systems incurred operating expenses of approximately \$12.2 billion in 1987 distributed as follows:
 - 76.3 percent of operating expenses were incurred by transit systems in urbanized areas with 2 million or more residents.
 - 13.5 percent of operating expenses were incurred by transit systems in urbanized areas with between 1 and 2 million residents.
 - 7.4 percent of operating expenses were incurred by transit systems in urbanized areas with between 200,000 and 1,000,000 residents.
 - 2.8 percent of operating expenses were incurred by transit systems in urbanized areas with less than 200,000 residents.
- o In 1987 transit system labor (i.e. salaries and wages) costs, as a percentage of total operating expenses, ranged from 42.8 to over 51.8 percent. Fringe benefit expenses tended to increase with urbanized area population, ranging from 13.4 percent for transit systems in the smallest urbanized areas to 26.5 percent for transit systems in the largest urbanized areas.
- o Purchased transportation was used most extensively in the smallest urbanized areas, where 14.6 percent of transit system operating expenses were represented by purchased transportation. In the other urbanized areas, purchased transportation represented between 3.7 percent and 4.1 percent of transit system operating expenses.

TRANSIT OPERATING EXPENSES BY OBJECT CLASS
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987

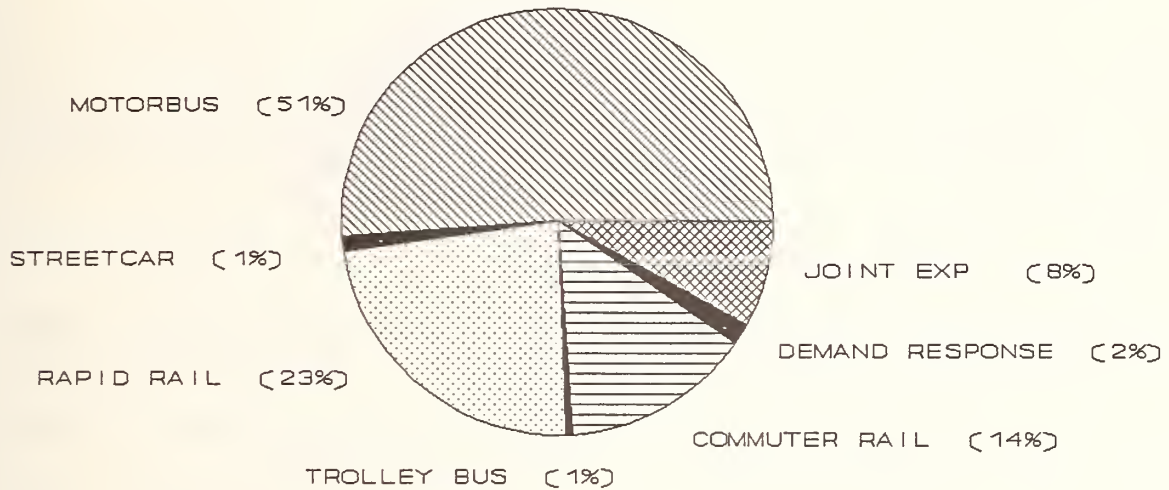


TRANSIT OPERATING EXPENSES BY OBJECT CLASS
ALL SYSTEMS BY URBANIZED AREA
SECTION 15 1987

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	ALL SYSTEMS
LABOR	42.8%	47.7%	49.7%	49.8%	51.8%	47.1%	47.8%
FRINGES	13.4%	19.0%	19.8%	22.4%	21.4%	26.5%	25.2%
SERVICES	5.6%	6.7%	4.8%	3.5%	4.2%	4.7%	4.6%
MATERIALS	13.9%	13.5%	13.8%	13.1%	12.7%	9.5%	10.3%
UTILITIES	1.4%	1.5%	1.3%	1.0%	2.6%	4.6%	4.0%
PURCHASED TRANS	14.6%	4.1%	3.9%	4.2%	3.7%	3.9%	4.0%
MISCELLANEOUS	8.9%	7.5%	6.8%	6.0%	3.7%	3.7%	4.0%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$107.5	\$231.1	\$418.4	\$479.7	\$1,649.1	\$9,289.6	\$12,175.4

- o Motor bus and rapid rail accounted for 73.9 percent of public transit operating costs in 1987: 50.8 and 23.1 percent, respectively.
- o On average, the operating costs for demand response systems were \$764,981, not including joint expenses. The 257 systems reporting in 1987 represented about 1.6 percent of the total transit operating costs.
- o Commuter rail and demand response services were the only two modes that were frequently provided through purchased service contracts. In particular, in 1987 over half of the operating expenses for demand response services were incurred through purchased service agreements.
- o Labor and fringe benefit expenses represented between 63.7 percent and 88.8 percent of total operating expenses for motor bus, rapid rail, streetcar, and trolley bus modes.
- o Rapid rail transit systems had, on average, the highest operating costs per system. In 1987 the average cost per rapid rail system was \$234.6 million. If New York City rapid rail system, with annual operating costs of \$1.77 billion, is excluded, the average operating cost of all the other rapid rail systems would be \$94.6 million.

TRANSIT OPERATING EXPENSES BY MODE
ALL MODES BY OBJECT CLASS
SECTION 15 1987



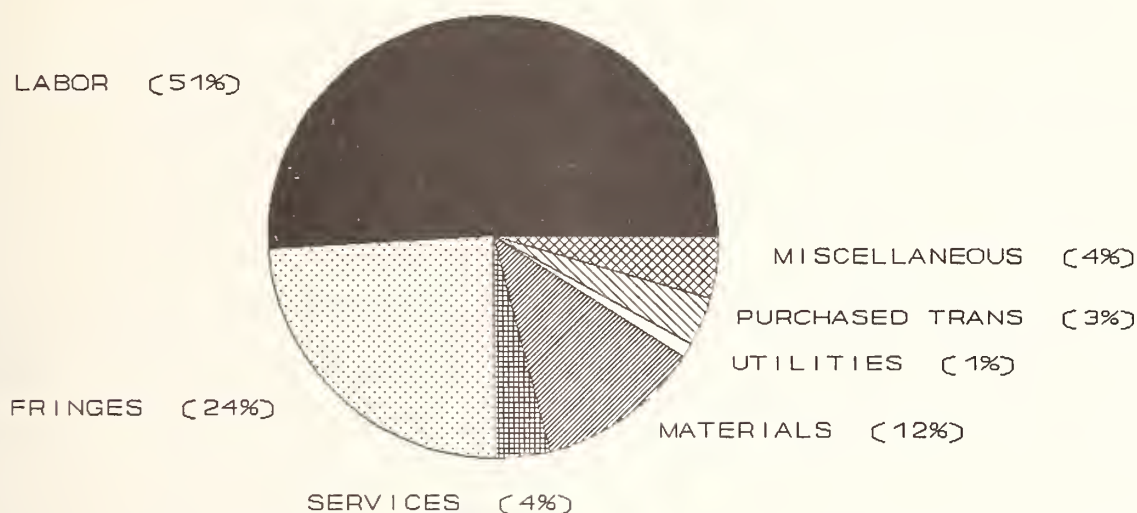
The graph shows percentage of individual mode operating expenses to total operating expenses.

TRANSIT OPERATING EXPENSES BY MODE
ALL MODES BY OBJECT CLASS
SECTION 15 1987

MODE -->	MOTOR BUS	RAPID RAIL	STREET CAR	TROLLEY BUS	COMMUTER RAIL	DEMAND RESPONSE	JOINT EXPENSE	ALL SYSTEMS
LABOR	50.8%	50.1%	51.8%	62.1%	39.7%	20.6%	37.9%	47.8%
FRINGES	24.3%	29.6%	26.1%	26.7%	24.0%	6.9%	24.8%	25.2%
SERVICES	4.0%	2.6%	4.0%	1.0%	5.5%	4.3%	12.8%	4.6%
MATERIALS	12.0%	7.8%	8.1%	5.5%	10.9%	4.9%	8.4%	10.3%
UTILITIES	1.1%	9.1%	7.3%	3.5%	6.4%	0.5%	4.2%	4.0%
PURCHASED TRANS	3.5%	0.0%	0.0%	0.0%	9.5%	59.0%	0.1%	4.0%
MISCELLANEOUS	4.5%	0.9%	2.9%	1.1%	4.1%	3.6%	11.9%	4.0%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$6,181.0	\$2,815.4	\$142.7	\$65.2	\$1,706.7	\$196.6	\$959.2	\$12,175.4
SYSTEMS REPORTING	379	12	12	5	18	257	79	443

- o The \$6.2 billion in total motor bus transit operating expenses incurred in 1987 (not including joint expenses) were distributed as follows:
 - The six largest motor bus systems incurred \$2.25 billion or 36.5 percent of the total costs.
 - The 12 transit systems with 500 to 999 motor buses incurred \$1.13 billion or 18.3 percent of total costs.
 - The 68 transit systems with 100 to 499 motor buses incurred \$1.99 billion or 32.2 percent of total costs.
 - The 293 transit systems with less than 100 motor buses incurred \$806.7 million or 13.1 percent of the total costs.
- o Motor bus labor and fringe benefit expenses represented \$4.64 billion in 1987, 75.1 percent of total operating expenses not including joint expenses. Materials expense represented the next largest expense area with between 10.9 and 14.5 percent of total operating costs.
- o Motor bus systems with less than 250 vehicles used purchase-of-service agreements more extensively than the larger motor bus systems.
- o Labor and fringe benefit expenses represented 81.9 percent of total operating costs for the largest transit systems and between 44.8 and 78.9 percent of operating expenses for other transit systems.

MOTOR BUS OPERATING EXPENSES
BY OBJECT CLASS AND FLEET SIZE
SECTION 15 1987



MOTOR BUS OPERATING EXPENSES BY OBJECT CLASS AND FLEET SIZE
SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
LABOR	33.9%	48.4%	48.0%	47.4%	49.6%	55.3%	53.0%	50.8%
FRINGES	10.9%	19.9%	19.9%	20.0%	24.0%	23.6%	28.9%	24.3%
SERVICES	6.2%	5.8%	5.0%	4.9%	5.1%	3.4%	2.7%	4.0%
MATERIALS	11.5%	14.5%	13.2%	11.8%	12.2%	12.7%	10.9%	12.0%
UTILITIES	1.3%	1.5%	1.2%	1.0%	1.2%	1.7%	0.6%	1.1%
PURCHASED TRANSPORTATION	27.8%	0.9%	3.3%	7.9%	3.0%	1.6%	1.1%	3.5%
MISCELLANEOUS	8.4%	9.1%	9.4%	7.0%	4.9%	1.7%	2.9%	4.5%
TOTAL (PERCENTAGE)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL (MILLIONS)	\$220.60	\$283.70	\$302.40	\$896.80	\$1,095.10	\$1,128.50	\$2,253.90	\$6,181.00
SYSTEMS REPORTING	176	77	40	47	21	12	6	379



CHAPTER II - OPERATIONAL STATISTICS

OVERVIEW

This chapter contains aggregate statistics on transit operations. The service supply and service utilization information describes the three basic categories of operational statistics:

- o Resource input statistics - transit system supply of vehicular and labor resources;
- o Service output statistics - amount of service produced per resources consumed; and
- o Service utilization statistics - extent to which the public utilizes the services generated.

Operational information for the charts and tables in this chapter comes from the Section 15 400 series forms. For the resource input category, vehicle fleet and employee statistics were selected. The service outputs category includes vehicle hours, vehicle miles, vehicle revenue hours, and vehicle revenue miles statistics. The third category, service utilization, includes unlinked passenger trips and passenger miles. More detailed statistics on transit system operational characteristics appear in Table 3.12 through Table 3.17 of the Section 15 Annual Report. These tables include the statistics presented here, and contain other operational information as well, such as accident and roadcall statistics.

In the tables and charts in Chapter II, all operational information, with the exception of transit employee statistics and fleet age data, is in actual numbers. Employee statistics are in percentages except for the second total, which provides a count of the total employees for each mode. The fleet age table gives the total number of vehicles in each mode, the percentage of the fleet in each age category, and finally the average age of the fleet in years. As in the operating expense section, operational statistics are organized according to transit mode and fleet size, with special emphasis accorded the two major public transit modes--motor bus and rapid rail.

SERVICE SUPPLY AND SERVICE UTILIZATION STATISTICS

These statistics show the amount of service provided to the public and the public's use of these services. For this reason, it is important that the reader understand the nature of these statistics and some of the difficulties involved in collecting and interpreting them.

"Service supplied" statistics refer to four types of vehicles outputs: vehicles miles, vehicle revenue miles, vehicle hours, and vehicle revenue hours. Vehicle hours and miles represent the total times and distances traveled by vehicles, including the miles and hours traveled on scheduled routes and miles and hours required to get to and from these routes. Vehicle revenue miles and vehicle revenue hours, by contrast, are the times and distances traveled in revenue service only.

The difference between vehicle miles and vehicle revenue miles represents "deadhead" (non-revenue) miles. Interpretation and measurement of what constitutes deadhead mileage--and, accordingly, all four service supply measures--often differs from one transit agency to another. Efforts to render this information more comparable through the Section 15 validation process and through development of clearer definitions have produced greater consistency.

Two types of service utilization statistics are reported under the Section 15 program--unlinked passenger trips and passenger miles. Unlinked passenger trip statistics reflect the total number of trips made on a particular mode, regardless of the number of passengers carried. Each time a passenger transfers, he/she is counted as having taken another trip. This practice, however, makes it difficult to compare the number of passenger trips between the modes because, for example, when passenger transfer from one bus to another, the count would be two trips while on rail service such a transfer would be counted only as one trip.

Passenger mile statistics describe the total distance traveled by transit passengers, thereby relating total trips to the average distance traveled on each trip. Passenger miles on the other hand is comparable between modes because it counts the total distance of the trip taken by a passenger and the transfer factor does not play a role.

Estimating this information has posed a difficult data-gather problem for some systems, particularly the smaller systems. In many instances the passenger-related data are collected through one of the several sampling techniques recommended by UMTA. Transit systems, however, may apply any sampling procedure they desire, provided that the technique yields estimates that satisfy precision and confidence requirements of 10 percent and 95 percent respectively.

PATTERNS AND TRENDS

Following are descriptions of some of the key operational patterns and statistics revealed in the tables and charts in this chapter.

Resource Input Statistics

- o In 1987 there were over 61,116 transit vehicles operated in maximum service. These vehicles provided service in the following modes:
 - 68.7 percent provided motor bus service (383 systems);
 - 12.7 percent provided rapid rail service (12 systems);

- 1.8 percent provided streetcar and trolley bus service (17 systems);
 - 6.8 percent provided commuter rail service (14 systems);
 - 9.4 percent provided demand responsive service (261 systems); and
 - 0.7 percent provided other services such as ferry boat and inclined plane (30 systems).
- o In 1987 NYCTA accounted for 62.8 percent of total U.S. national rapid rail vehicles. Chicago, the second largest system, accounted for 12.0 percent of the rapid rail vehicles. The other 10 systems accounted for 1,949 rapid rail vehicles, 25.2 percent of the total national fleet.
 - o Of the more than 200,000 reported equivalent employees in the public transportation industry, 44.1 percent of the employees are directly involved in vehicle operations.

Service Output Statistics

- o Motor bus supplied the greatest amount of transit service in 1987: 73.6 percent of total vehicle revenue hours and 65.1 percent of total vehicle revenue miles.
- o Rapid rail, the second largest transit mode, accounted for 15.5 percent of total vehicle revenue hours and 20.8 percent of total vehicle revenue miles.
- o Purchased transportation represented the major source of demand response services in 1987, accounting for 68.9 percent of demand response vehicle revenue hours and 66.9 percent of demand vehicle revenue miles.
- o In 1987, transit systems in larger urbanized areas provided a greater proportion of the vehicle revenue miles of transit services:
 - Transit systems in urbanized areas with 2 million or more residents provided 64.3 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with between 1 and 2 million more residents provided 16.6 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with between 200,000 and 1 million residents provided 13.2 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with less than 200,000 residents provided 5.9 percent of the transit vehicle revenue miles.

Service Utilization Statistics

- o Motor bus served the greatest number of passengers trips in 1987 (4.79 billion), accounting for 61.1 percent of total passenger trips and 47.4

percent of total passenger miles.

- o Rapid rail served the second most passenger trips in 1987 (2.40 billion), accounting for 30.6 percent of total passenger trips and 31.0 percent of total passenger miles.
- o All other modes of transit service accounted for 650.9 million passenger trips in 1987, accounting for 8.3 percent of total passenger trips and 21.6 percent of total passenger miles.
- o Between 1983 and 1987, there has been an overall loss of 400 million passenger trips for all modes despite the fact of an increased level of rail service during this time period.

II. TRANSIT INDUSTRY OPERATIONS



A. RESOURCE INPUTS

- o In 1987 there were over 61,116 transit vehicles operated in maximum service. These vehicles provided service in the following modes:
 - 68.7 percent provided motor bus service (383 systems);
 - 12.7 percent provided rapid rail service (12 systems);
 - 1.8 percent provided streetcar and trolley bus service (17 systems);
 - 6.8 percent provided commuter rail service (14 systems);
 - 9.4 percent provided demand responsive service (261 systems); and
 - 0.7 percent provided other services such as ferry boat and inclined plane (30 systems).

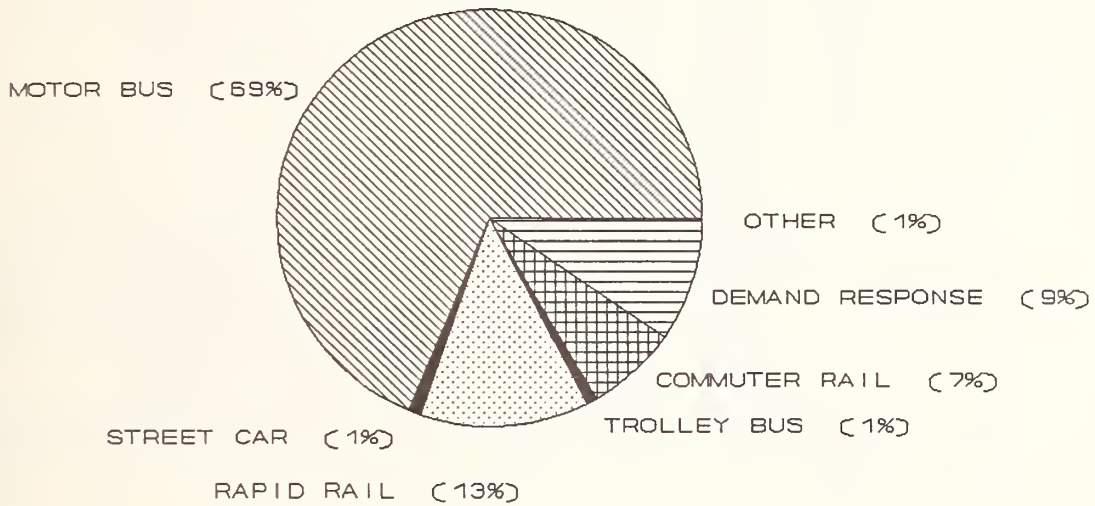
- o Transit systems operating modal fleets of 500 or more vehicles on a typical weekday accounted for 47.2 percent of the motor bus vehicles, 74.8 percent of the rapid rail vehicles and 57.6 percent of the commuter rail vehicles.

- o Transit systems operating modal fleets of 100 or less vehicles on a typical weekday accounted for 21.1 percent of all transit vehicles and 18.3 percent of the motor bus service.

- o In 1987, demand response vehicles, although comprising only 9.4 percent of urban public transportation vehicles in maximum service, constituted nearly 31.2 percent of the vehicles in service for systems with revenue fleets of less than 100 vehicles and nearly 39 percent of the vehicles in service for systems with less than 25 vehicles.

- o Of the 710 modal systems receiving Federal monies in 1987:
 - 13.4 percent of the vehicles operated in fleets of fewer than 50 vehicles
 - 7.7 percent of the vehicles operated in fleets of 50 to 99 vehicles
 - 33.1 percent of the vehicles operated in fleets of 100 to 499 vehicles
 - 45.8 percent of the vehicles operated in fleets of 500 or more vehicles.

VEHICLES OPERATED ON TYPICAL WEEKDAY
DURING PERIOD OF MAXIMUM SCHEDULED SERVICE
BY MODE AND FLEET SIZE
SECTION 15 1987

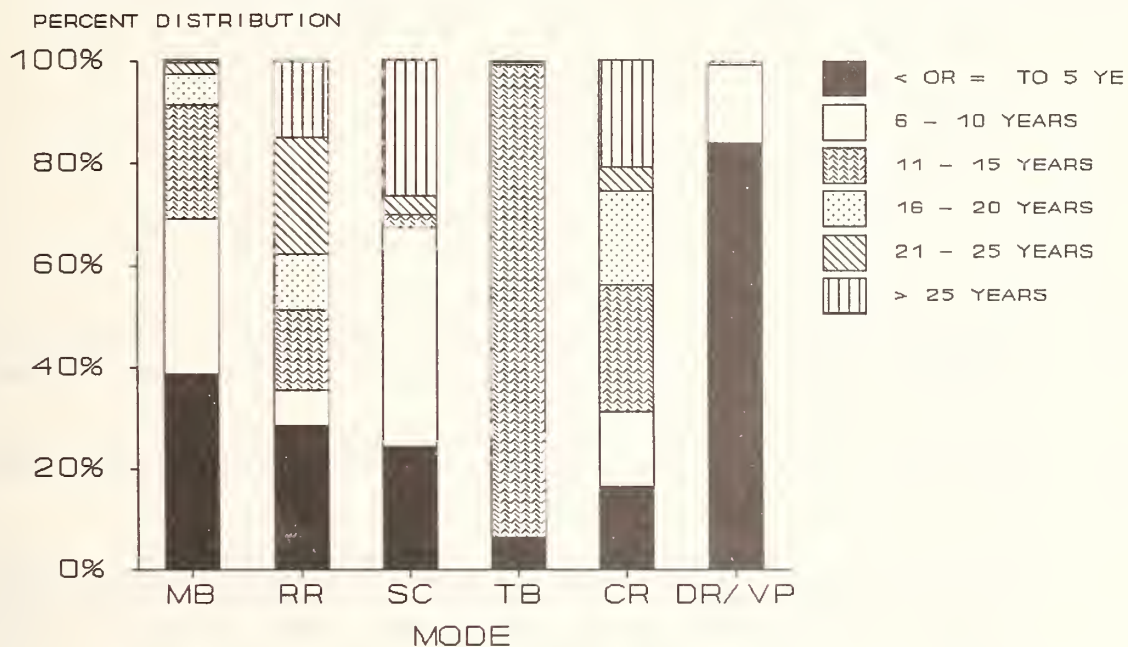


VEHICLES OPERATED ON TYPICAL WEEKDAY
DURING PERIOD OF MAXIMUM SCHEDULED SERVICE
BY MODE AND FLEET SIZE
SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
MOTOR BUS	2,144	2,754	2,782	7,204	7,271	8,464	11,365	41,984
RAPID RAIL	0	77	164	356	1,352	925	4,857	7,731
STREET CAR	124	28	62	398	0	0	0	612
TROLLEY BUS	24	0	211	230	0	0	0	465
COMMUTER RAIL	5	77	121	781	784	1,347	1,055	4,170
DEMAND RESPONSE	1,514	1,199	1,302	1,336	365	0	0	5,716
OTHER	94	127	58	159	0	0	0	438

- o In 1987, the average age of the rapid rail fleet was 23.9 years, and more than 37.9 percent of the vehicles in the fleet were more than 20 years old. This represented an improvement, since 44.6 percent of the rapid rail fleet was more than 20 years old in 1986.
- o With the exception of rapid rail, commuter rail cars, and trolley bus which have longer useful lives, the majority of transit vehicles in all modes were less than 10 years old in 1987. More specifically:
 - 69.2 percent of the motor bus fleet (36,575) vehicles) were less than 10 years old.
 - 67.3 percent of the streetcar fleet (604 vehicles) were less than 10 years old.
 - 99.1 percent of the demand response and van pool fleet (4,503 vehicles) were less than 10 years old.

TRANSIT REVENUE VEHICLE FLEET AGE
BY MAJOR MODE
SUMMARY AGE DISTRIBUTION
SECTION 15 1987

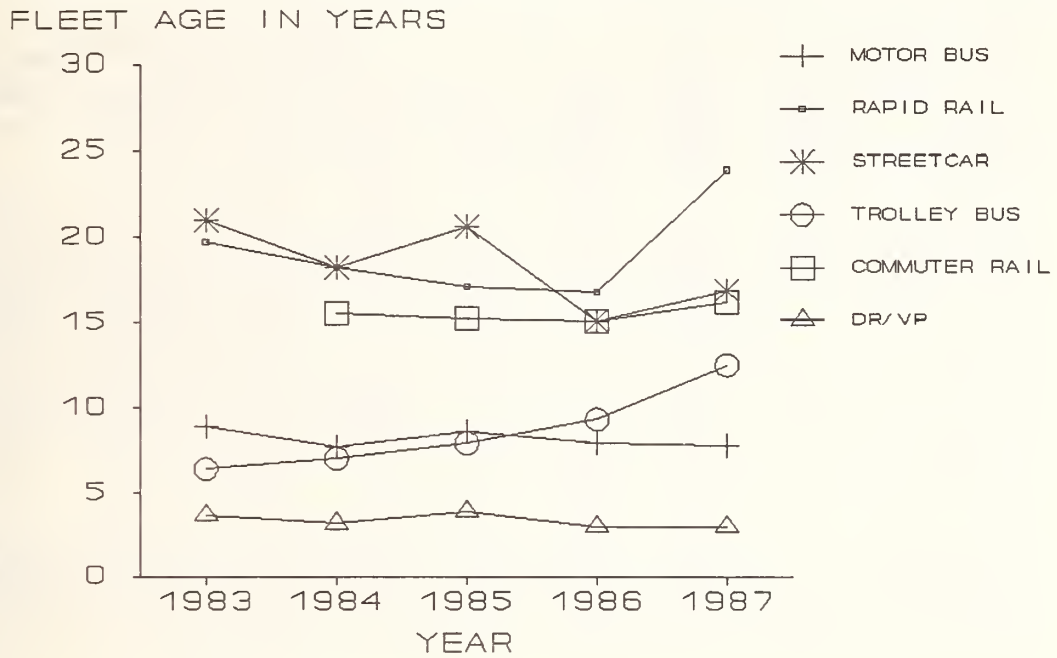


TRANSIT REVENUE VEHICLE FLEET AGE
BY MAJOR MODE
SUMMARY AGE DISTRIBUTION - SECTION 15 1987

	FLEET SIZE	< OR = 5 YEARS	6-10 YEARS	11-15 YEARS	16-20 YEARS	21-25 YEARS	> 25 YEARS	AVERAGE AGE
MOTOR BUS	52,854	38.9%	30.3%	22.3%	5.9%	2.4%	0.3%	7.8
RAPID RAIL	10,350	28.6%	7.1%	15.6%	10.8%	23.0%	14.9%	23.9
STREETCAR	898	24.4%	42.9%	2.6%	0.0%	3.2%	26.5%	16.9
TROLLEY BUS	713	6.5%	0.0%	92.7%	0.4%	0.0%	0.4%	12.5
COMMUTER RAIL	5,191	16.5%	14.8%	25.0%	18.2%	4.9%	20.7%	16.2
DEMAND RESPONSE/VAN POOL	4,544	84.0%	15.1%	0.8%	0.0%	0.0%	0.1%	3.0

- o There were declines in the number of vehicles in the motor bus fleets and increases in the other modes for a net change (increase) of 355 vehicles in 1987 over 1986.
- o Motor bus transit system average fleet age decreased between 1983 and 1987 from 8.9 to 7.8 years.
- o The decline in the age of the U.S. streetcar fleet from 21.0 years in 1983 to 16.9 in 1987 indicates efforts to modernize that fleet. In 1987, approximately 24 percent of the streetcar vehicles were 5 years old or less, while over 26.5 percent were more than 25 years old.
- o The trolley bus fleet was expanded and modernized during the past 10 years. Consequently, this has one of the youngest fleets of all fleets made up of the full-size transit vehicles.
- o Demand response and van pool vehicles have the shortest average life of all transit vehicles because of their construction. These vehicles were generally replaced every three to five years.

TRANSIT REVENUE FLEET AGE TRENDS
BY MODE
SECTION 15 1983-1987

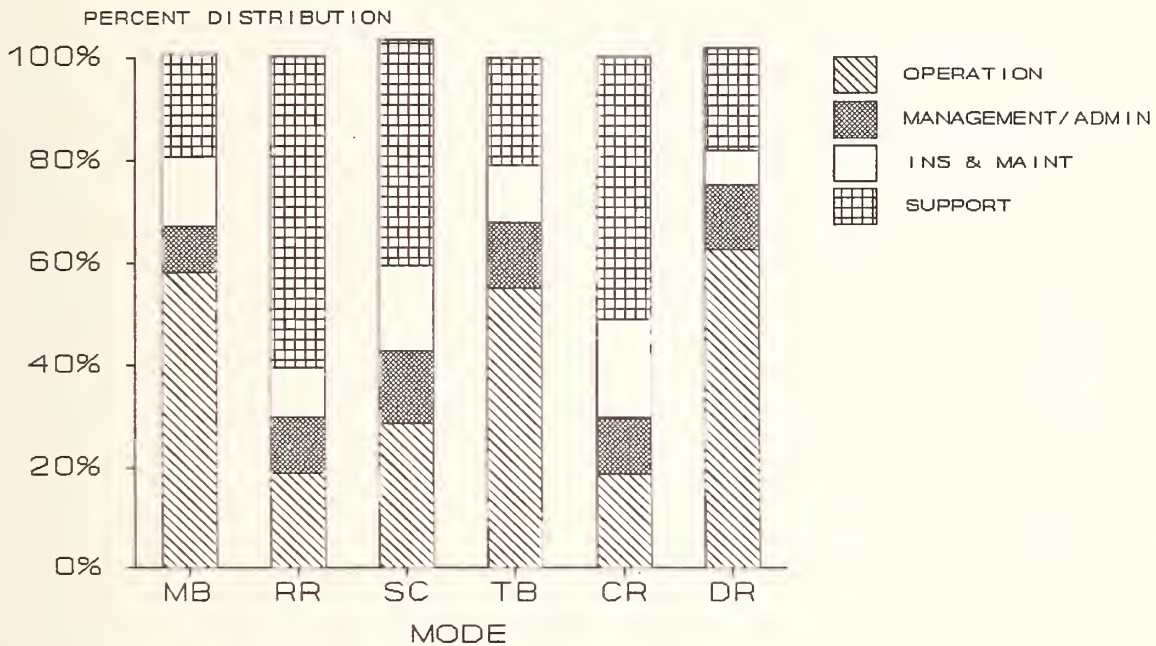


TRANSIT REVENUE FLEET AGE TRENDS
BY MODE
SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	8.9	7.7	8.6	7.9	7.8
RAPID RAIL	19.7	18.2	17.1	16.8	23.9
STREETCAR	21.0	18.2	20.6	15.1	16.9
TROLLEY BUS	6.4	7.0	7.9	9.3	12.5
COMMUTER RAIL	N/A	15.5	15.2	15.1	16.2
DEMAND RESPONSE/VAN POOL	3.7	3.2	3.9	3.0	3.0

- o Approximately 96 percent of transit employees working in the traditional urban transit modes (i.e., modes other than commuter rail services) were employed in the motor bus or rapid rail modes. In 1987, the motor bus mode employed 68.4 percent of public transit employees and rapid rail employed 27.2 percent.
- o Generally, the distribution of employees was similar among the three rail modes (rapid rail, streetcar, and commuter rail) and among the three non-rail modes (motor bus, trolley bus and demand response). For example, in general, rail services employ fewer operators than the non-rail services, since the rail modes often operate as vehicle trains rather than as single vehicles. Non-vehicle maintenance (of track, road beds, and facilities) employs far more people in rail service than in the non-rail services. Support personnel are more numerous in the rail than non-rail modes.
- o The number of employees reflects, to some extent, both the size and complexity of a public transportation system. Based on the data reported in 1987 for Section 15 requirements, transit modes reported the following average number of employee equivalents:
 - Motor bus - 378 employees.
 - Rapid rail - 4,278 employees (New York City Transit Authority employees 33,794.1 employee equivalents or approximately two thirds of all employee equivalents in the rapid rail industry).
 - Streetcar - 299 employees.
 - Trolley bus - 418 employees.
 - Commuter rail - 2,300 employees.
 - Demand response - 17 employees.
- o Of the more than 200,000 reported equivalent employees in the public transportation industry, 44.1 percent of the employees are directly involved in vehicle operations.

TRANSIT SYSTEM EMPLOYEES
BY EMPLOYEE CLASSIFICATION AND MODE
SECTION 15 1987



TRANSIT SYSTEM EMPLOYEES
BY EMPLOYEE CLASSIFICATION AND MODE
SECTION 15 1987

	MOTOR BUS	RAPID RAIL	STREET CAR	TROLLEY BUS	COMMUTER RAIL	DEMAND RESPONSE
REVENUE VEHICLE OPERATION	58.2%	18.8%	28.7%	55.0%	18.7%	62.6%
MANAGEMENT/ADMINISTRATION	8.8%	11.1%	14.1%	12.9%	11.0%	12.7%
REV VEH INSPECTION & MAINTENANCE	13.7%	9.7%	16.5%	11.2%	19.3%	6.8%
SUPPORT PERSONNEL	20.0%	60.5%	44.1%	20.9%	51.2%	19.8%
TOTAL (PERCENT)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
TOTAL EMPLOYEE EQUIVALENTS	128,964.7	51,333.1	3,584.3	2,090.1	20,702.9	2,446.1
SYSTEMS REPORTING	341	12	12	5	9	143

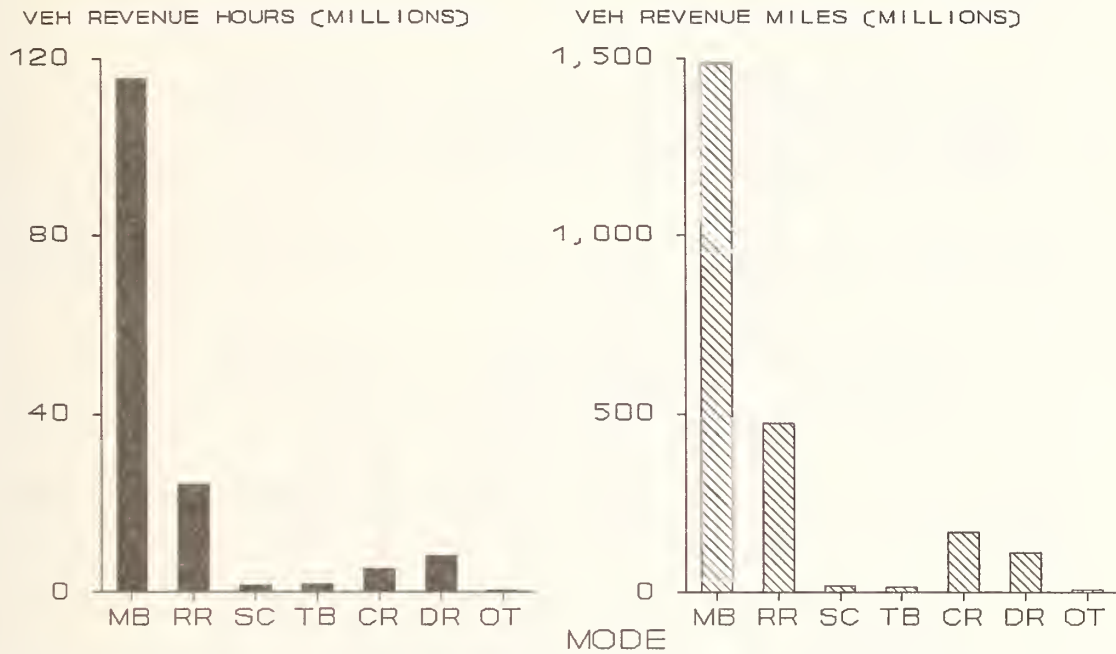
* Differences in percentages are due to rounding errors.



B. SERVICE OUTPUTS

- o Motor bus supplied the greatest amount of transit service in 1987: 73.6 percent of total vehicle revenue hours and 65.1 percent of total vehicle revenue miles.
- o Rapid rail, the second largest transit mode, accounted for 15.5 percent of total vehicle revenue hours and 20.8 percent of total vehicle revenue miles.
- o Purchased transportation represented the major source of demand response services in 1987, accounting for 68.9 percent of demand response vehicle revenue hours and 66.9 percent of demand vehicle revenue miles.
- o Between 1986 and 1987 the number of motor bus transit systems reporting data for this exhibit increased by 2.4 percent from, 374 to 383. With this increase in the number of reporting systems, there was a 1.3 percent increase in the number of motor bus vehicle revenue hours and a 0.5 percent increase in the number bus revenue vehicle miles.
- o There were other changes noted between 1986 and 1987 in the number of systems reporting and the number of vehicle revenue hours of service provided by mode:
 - There was no change in the number of rapid rail systems reporting; there was a 1.3 percent increase in the number of vehicle revenue hours of service and 2.5 percent increase in vehicle revenue miles.
 - The number of streetcar systems reporting increased from 10 to 12 (20 percent); streetcar vehicle revenue hours of service increased by 2.6 percent and vehicle revenue miles increased by 7.8 percent.
 - There was no change in the number of trolley bus systems reporting; and there was a 0.6 percent increase in the number of vehicle revenue hours of service and a decrease of 1.3 percent of vehicle revenue miles.
 - The number of commuter rail systems reporting decreased from 15 to 14 (6.3 percent); the number of commuter rail vehicle revenue hours of service decreased by 0.2 percent and vehicle revenue miles decreased by 0.2 percent.
 - The number of demand response systems reporting increased from 238 to 254 (6.7 percent); there was a decrease of vehicle revenue hours of service of 2 percent and the number of demand response vehicle revenue miles of service increased by 7.9 percent.

VEHICLE REVENUE HOURS AND MILES
OF SERVICE SUPPLIED
ALL MODES
SECTION 15 1987



VEHICLE REVENUE HOURS AND MILES
OF SERVICE SUPPLIED
ALL MODES -- SECTION 15 1987

HOURS AND MILES IN THOUSANDS

	MOTOR BUS	RAPID RAIL	STREET CAR	TROLLEY BUS	COMMUTER RAIL	DEMAND RESPONSE	OTHER	TOTAL
<u>VEH REVENUE HOURS</u>								
DIRECTLY OPERATED	112,889.9	24,273.7	1,508.1	1,771.4	5,125.0	2,510.9	443.9	148,522.9
PURCHASED	2,393.7	0.0	0.0	0.0	161.1	5,556.2	75.0	8,186.0
TOTAL	115,283.6	24,273.7	1,508.1	1,771.4	5,286.1	8,067.1	518.9	156,708.9
<u>VEH REVENUE MILES</u>								
DIRECTLY OPERATED	1,444,902.5	473,921.4	18,014.7	14,401.0	162,929.2	37,451.4	6,616.5	2,158,236.8
PURCHASED	39,431.3	0.0	0.0	0.0	6,971.5	75,648.6	986.6	123,038.2
TOTAL	1,484,333.8	473,921.4	18,014.7	14,401.0	169,900.7	113,100.0	7,603.3	2,281,274.9
SYSTEMS REPORTING	383	12	12	5	14	254	30	710

- o In 1987, the 6 largest motor bus systems accounted for:
 - 31.2 percent of motor bus vehicle revenue hours.
 - 27.1 percent of motor bus vehicle revenue miles.
 - 43.6 percent of motor bus passenger trips.
 - 38.0 percent of motor bus passenger miles.

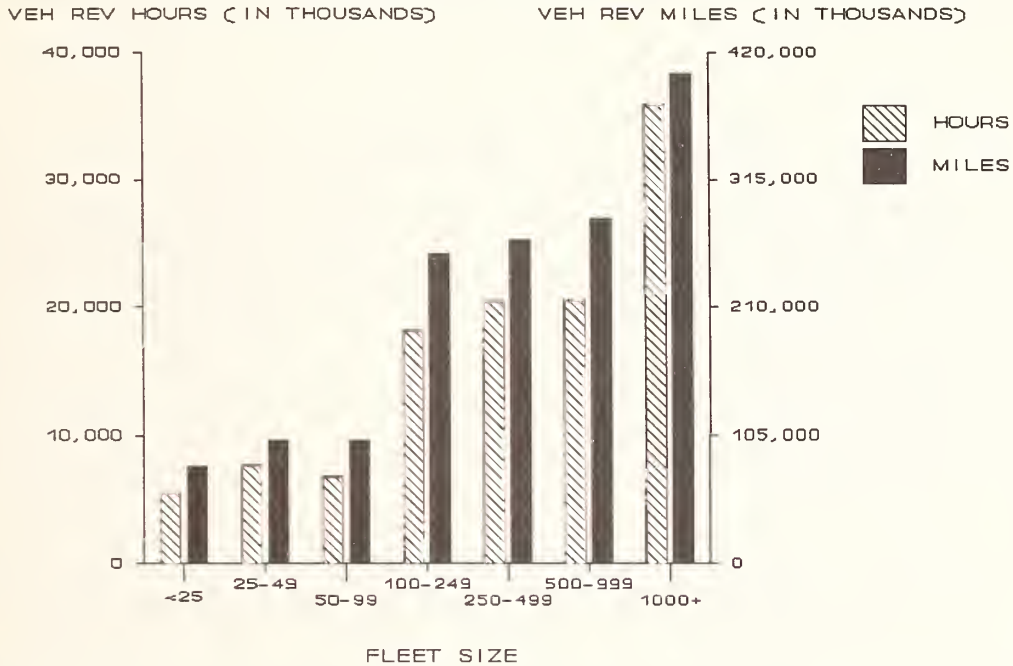
- o In contrast, the 80 motor bus systems with fleets of between 100 and 999 vehicles supplied:
 - 51.3 percent of motor bus vehicle revenue hours.
 - 53.9 percent of motor bus vehicle revenue miles.
 - 45.7 percent of motor bus passenger trips.
 - 50.7 percent of motor bus passenger miles.

- o About half the motor bus fleets (180 systems of 383) had less than 25 vehicles and supplied:
 - 4.9 percent of motor bus vehicle revenue hours.
 - 5.4 percent of motor bus vehicle revenue miles.
 - 2.6 percent of motor bus passenger trips.
 - 2.7 percent of motor bus passenger miles.

- o In 1987, the average motor system speed for all motor bus systems in revenue service was 12.9 miles per hour. The systems reporting the fastest average speed were in 50-to-99 bus system group, with average speeds of 14.9 miles per hour and the systems with the slowest speeds were the 1,000-and-over motor bus systems, with an average speed of 11.2 miles per hour.

- o Purchased transportation represented 14.2 percent of the total vehicle revenue hours for transit systems under 25 vehicles. It represented 1.0 and 5.3 percent of the vehicle revenue hours respectively, for transit systems with 25 to 49 and 50 to 99 vehicles. For all other transit system size groups purchased transportation represented between 0.8 and 1.4 percent of the vehicle revenue hours.

MOTOR BUS REVENUE HOURS AND MILES
OF SERVICE SUPPLIED BY FLEET SIZE
SECTION 15 1987



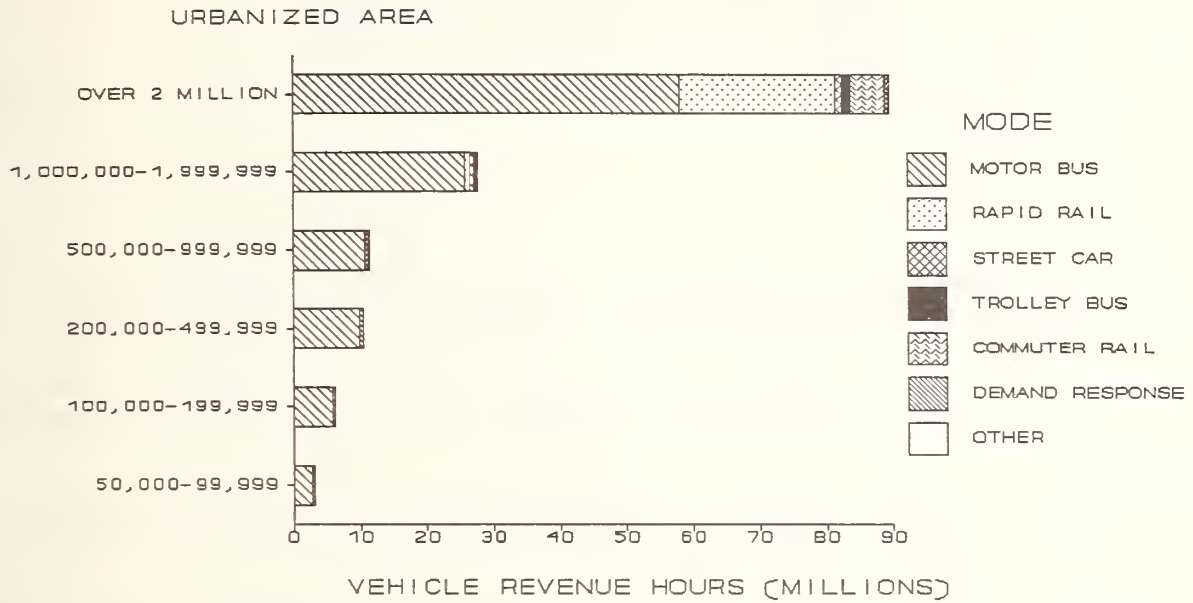
MOTOR BUS REVENUE HOURS AND MILES OF SERVICE SUPPLIED
BY FLEET SIZE
SECTION 15 1987

HOURS & MILES IN THOUSANDS

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
<u>VEH REVENUE MILES</u>								
DIRECTLY OPERATED	66,155.5	99,411.3	95,474.4	243,737.1	263,587.9	278,347.8	398,188.5	1,444,902.5
PURCHASED	13,763.7	1,341.3	5,747.7	9,088.8	1,416.4	4,010.1	4,063.9	39,431.3
TOTAL	79,919.2	100,752.6	101,221.5	252,825.9	265,004.3	282,357.9	402,252.4	1,484,333.8
<u>VEH REVENUE HOURS</u>								
DIRECTLY OPERATED	4,869.3	7,619.8	6,420.3	17,623.2	20,394.4	20,295.3	35,667.5	112,889.9
PURCHASED	805.1	80.3	362.7	544.4	61.2	251.1	289.0	2,393.7
TOTAL	5,674.4	7,700.1	6,783.0	18,167.6	20,455.6	20,546.4	35,956.5	115,283.6
SYSTEMS REPORTING	180	77	40	47	21	12	6	383

- o Transit systems in urbanized areas with 2 million or more residents supplied 60.3 percent of all public transit vehicle revenue hours in 1987, and accounted for 74.0 percent of the unlinked transit passenger trips and 82.7 percent of passenger miles.
- o Transit systems in urbanized areas with between 1 and 2 million residents supplied 18.7 percent of all public transit vehicle revenue hours in 1987, and accounted for 15.2 percent of the unlinked passenger trips and 10.4 percent of passenger miles.
- o Transit systems in urbanized areas with between 200,000 and 1 million residents supplied 14.7 percent of all public transit vehicles revenue hours in 1987, and accounted for 8.4 percent of the unlinked passenger trips and 5.0 percent of passenger miles.
- o Transit systems in urbanized areas with less than 200,000 inhabitants supplied 6.3 percent of all public transit vehicle revenue hours in 1987, and accounted for 2.5 percent of the unlinked passenger trips and 1.9 percent of passenger miles.
- o Commuter rail services were only available in urbanized areas with 2 million or more residents. Rapid rail and streetcar services were usually only available in urbanized areas with 2 million or more residents; 3.6 percent of the rapid rail service and 29.4 percent of the streetcar service were available in urbanized areas with between one and two million residents. Only motor bus and demand response services were available in all urbanized area size groups.

VEHICLE REVENUE HOURS
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987



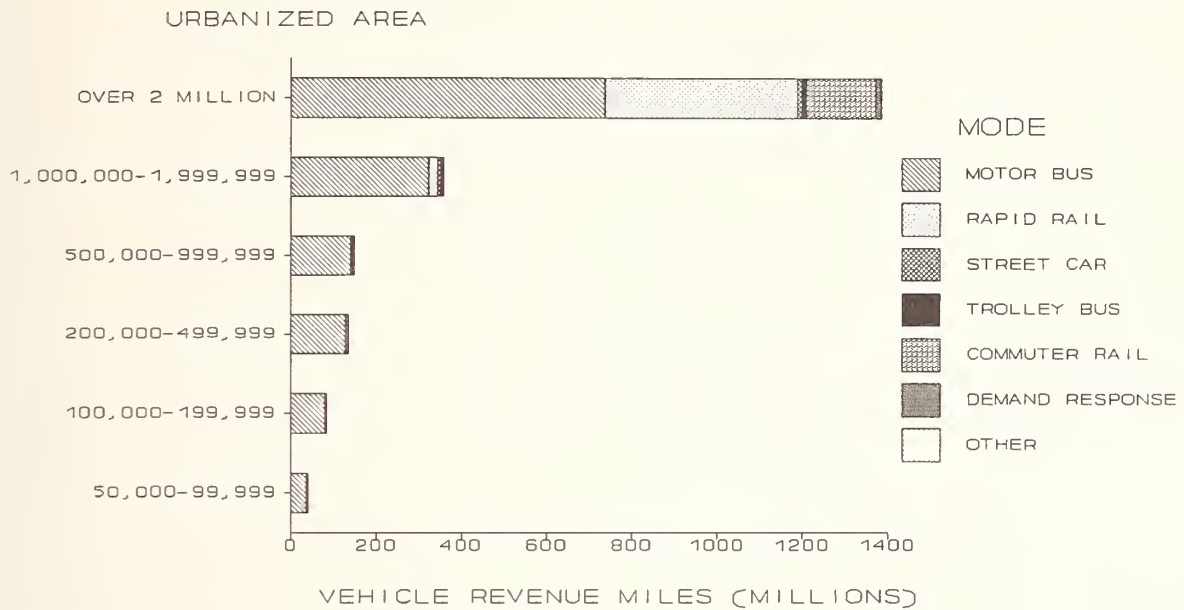
VEHICLE REVENUE HOURS (DIRECT)
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987

THOUSANDS OF HOURS

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
MOTOR BUS	2,664.2	5,890.8	9,881.0	10,727.5	25,714.2	58,012.2	112,889.9
RAPID RAIL	0.0	0.0	0.0	0.0	862.4	23,411.3	24,273.7
STREET CAR	0.0	0.0	0.0	0.0	444.0	1,050.6	1,508.1
TROLLEY BUS	0.0	0.0	0.0	185.9	306.7	1,278.8	1,771.4
COMMUTER RAIL	0.0	0.0	0.0	0.0	0.0	5,125.0	5,125.0
DEMAND RESPONSE	431.9	314.3	622.1	399.7	196.3	546.6	2,510.9
OTHER	3.3	20.6	12.3	26.1	234.8	146.8	443.9
TOT VEH REV HOURS	3,099.4	6,225.7	10,515.4	11,352.7	27,758.4	89,571.3	148,522.9

- o In 1987, transit systems in larger urbanized areas provided a greater proportion of the vehicle revenue miles of transit services:
 - Transit systems in urbanized areas with 2 million or more residents provided 64.3 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with between 1 and 2 million more residents provided 16.6 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with between 200,000 and 1 million residents provided 13.2 percent of the transit vehicle revenue miles.
 - Transit systems in urbanized areas with less than 200,000 residents provided 5.9 percent of the transit vehicle revenue miles.

**VEHICLE REVENUE MILES
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987**



**VEHICLE REVENUE MILES (DIRECT)
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987**

THOUSANDS OF MILES

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
MOTOR BUS	35,938.2	79,623.6	128,194.3	140,729.9	323,063.8	737,352.7	1,444,902.5
RAPID RAIL	0.0	0.0	0.0	0.0	21,179.8	452,741.6	473,921.4
STREET CAR	0.0	0.0	0.0	237.0	7,004.0	10,773.7	18,014.7
TROLLEY BUS	0.0	0.0	0.0	2,043.0	2,771.2	9,586.8	14,401.0
COMMUTER RAIL	0.0	0.0	0.0	0.0	0.0	162,929.2	162,929.2
DEMAND RESPONSE	5,304.0	4,299.4	7,829.6	5,729.6	2,590.8	11,698.0	37,451.4
OTHER	175.9	1,005.9	181.1	407.6	2,623.5	2,222.5	6,616.5
TOT VEH REV MILES	41,418.1	84,928.9	136,205.0	149,147.1	359,233.1	1,387,304.6	2,158,236.8

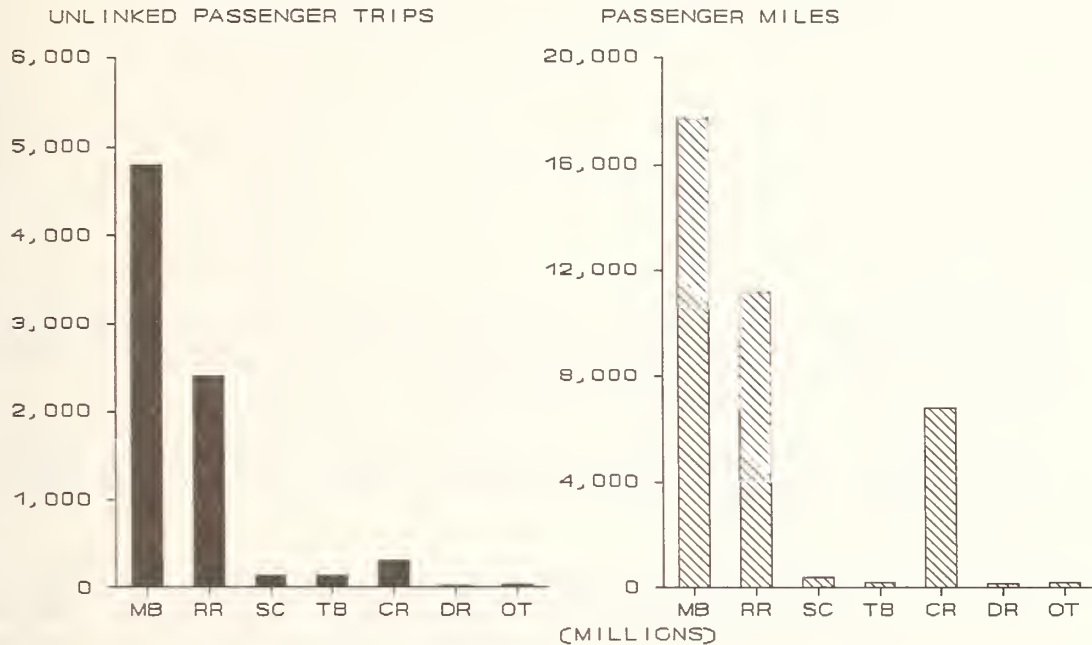


C. SERVICE UTILIZATION

- o Motor bus served the greatest number of passengers trips in 1987 (4.79 billion), accounting for 61.1 percent of total passenger trips and 47.4 percent of total passenger miles.
- o Rapid rail served the second most passenger trips in 1987 (2.40 billion), accounting for 30.6 percent of total passenger trips and 31.0 percent of total passenger miles.
- o All other modes of transit service accounted for 650.9 million passenger trips in 1987, accounting for 8.3 percent of total passenger trips and 21.6 percent of total passenger miles.
- o Purchased transportation arrangements were the major source of demand response services. In 1987, they accounted for 67.4 percent of total demand response passenger trips and 59.7 percent of total demand response passenger miles.
- o Of all transit riders in 1987, commuter rail patrons manifested the longest trip patterns, traveling, on average, 21.9 miles per trip. Thus, while commuter rail services provided 4.0 percent of public transit passenger trips, they accounted for 18.5 percent of public transit passenger miles.
- o Unlinked passenger trips is a statistic that does not necessarily measure transit trips from origin to destination; it shows, rather, individual legs of trips. An exception may be transfers from one line to another in a rapid rail service where passengers pay a single fare and transfer between lines without leaving the system. Bus-to-bus or bus-to-rail transfers would still, however count as separate unlinked trips.
- o Using the unlinked passenger trip and annual passenger mile data reported in 1987, average transit trip lengths were:

--	Motor bus	-	3.6 miles.
--	Rapid rail	-	4.7 miles.
--	Streetcar	-	3.1 miles.
--	Trolley bus	-	1.6 miles.
--	Commuter rail	-	21.9 miles.
--	Demand response	-	6.1 miles.
--	Other modes	-	5.0 miles.

TRANSIT SERVICE UTILIZATION
ALL SYSTEMS BY MODE
SECTION 15 1987



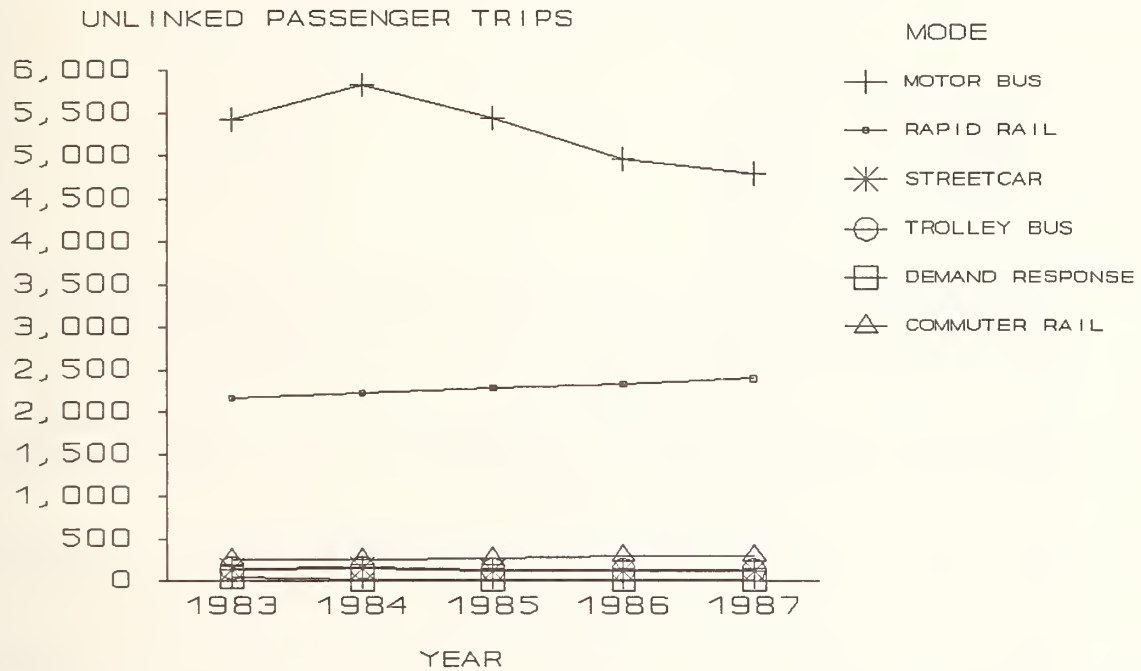
TRANSIT SERVICE UTILIZATION
ALL SYSTEMS BY MODE
SECTION 15 1987

TRIPS AND MILES IN MILLIONS

MODE -->	MOTOR BUS	RAPID RAIL	STREET CAR	TROLLEY BUS	COMMUTER RAIL	DEMAND RESPONSE	OTHER	ALL SYSTEMS
<u>UNLINKED PASSENGER TRIPS</u>								
DIRECTLY OPERATED	4,746.3	2,402.1	131.3	140.8	301.8	9.4	37.4	7,769.2
PURCHASED	48.0	0.0	0.0	0.0	9.2	19.4	2.1	78.7
TOTAL	4,794.3	2,402.1	131.3	140.8	311.0	28.8	39.5	7,847.9
<u>ANNUAL PASSENGER MILES</u>								
DIRECTLY OPERATED	16,810.7	11,198.0	404.4	222.7	6,540.1	71.2	184.6	35,431.6
PURCHASED	284.2	0.0	0.0	0.0	266.2	105.6	14.7	670.7
TOTAL	17,094.9	11,198.0	404.4	222.7	6,806.3	176.8	199.3	36,102.3
SYSTEMS REPORTING	383	12	12	5	14	254	30	710

- o Between 1983 and 1987, there has been an overall loss of 400 million passenger trips for all modes despite the fact of an increased level of rail service during this time period.
- o Only rapid rail and commuter rail services have had steady growth of passenger trips (an average annual rate of 2.6 percent and 4 percent respectively).
- o Motor bus systems have lost 628 million trips during the 1983-87 period at an average annual rate of 3 percent. Most of this can be explained that as new rail lines are opened for service, many motor bus systems have reduced service in favor of the rail service.
- o Streetcar and trolley bus have had average annual rate loss of passenger trips of 1.1 percent and 3.1 percent respectively.
- o With the exception of a heavy decrease in trips between 1983 and 1984, demand response has had a steady growth of passenger trips with an average annual increase between 1984 and 1987 of 7.5 percent.

TRANSIT SERVICE UTILIZATION TRENDS
UNLINKED PASSENGER TRIPS
ALL SYSTEMS BY MODE
SECTION 15 1983-1987

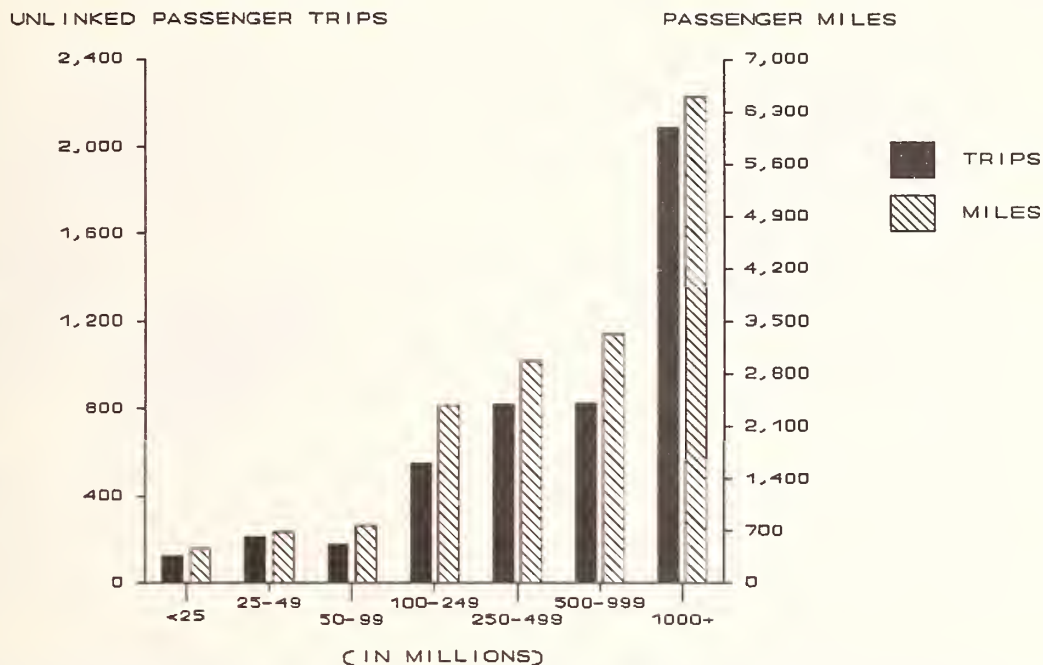


TRANSIT INDUSTRY SERVICE UTILIZATION TRENDS
UNLINKED PASSENGER TRIPS
ALL SYSTEMS BY MODE
SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	5,422.2	5,826.9	5,438.7	4,959.8	4,794.3
RAPID RAIL	2,167.3	2,231.4	2,289.8	2,332.7	2,402.1
STREET CAR	137.0	152.7	130.7	128.5	131.3
TROLLEY BUS	160.0	164.8	141.6	139.2	140.8
DEMAND RESPONSE	54.6	21.6	23.8	27.3	28.8
COMMUTER RAIL	261.6	266.7	275.3	305.8	311.0

- o In 1987, the 6 motor bus systems with 1,000 or more revenue vehicles operating in maximum service accounted for 43.6 percent of motor bus passenger trips and 38.0 percent of motor bus passenger miles.
- o The 80 motor bus systems with fleets of between 100 and 999 vehicles served 45.7 percent of motor bus passenger trips and 50.7 percent of motor bus passenger miles.
- o About half the motor bus fleets (180 systems) had less than 25 vehicles in maximum service and served 2.5 percent of motor bus passenger trips and 2.7 percent of motor bus passenger miles.
- o Although purchased transportation carried only 1.0 percent of all unlinked passenger trips it carried 13.1 percent of the unlinked passenger trips on systems with less than 25 vehicles.
- o The data reported suggest that the purchased transportation services tended to provide service to fewer passengers and that those passengers took trips about twice the distance of passengers using directly operated service.

**MOTOR BUS SERVICE UTILIZATION
BY SYSTEM SIZE
SECTION 15 1987**



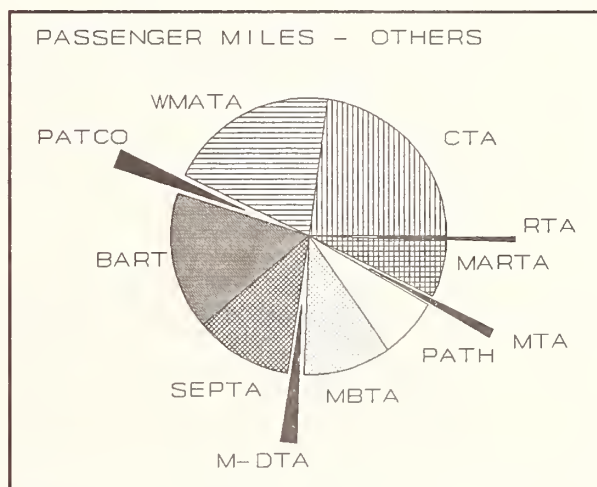
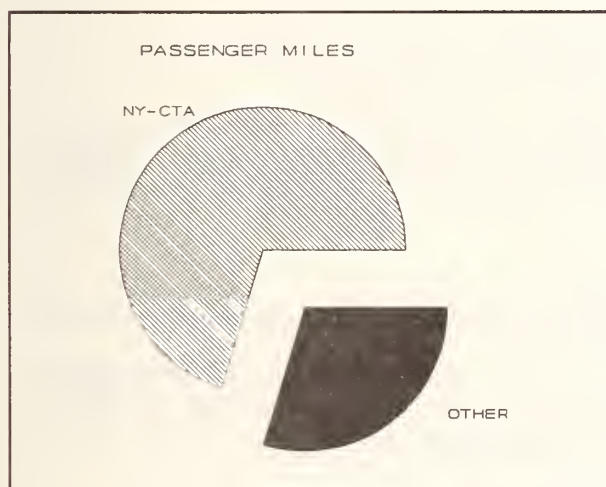
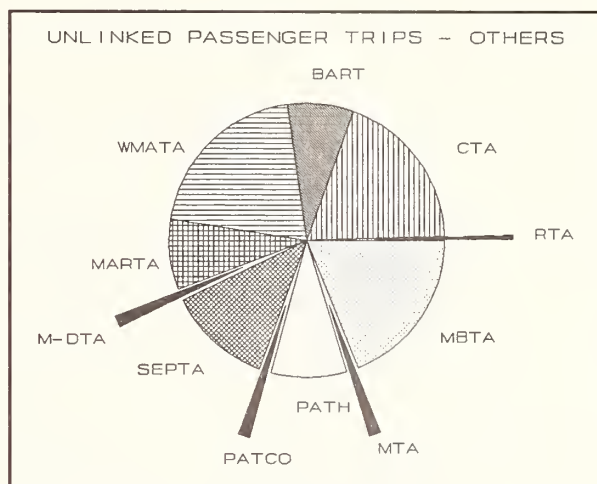
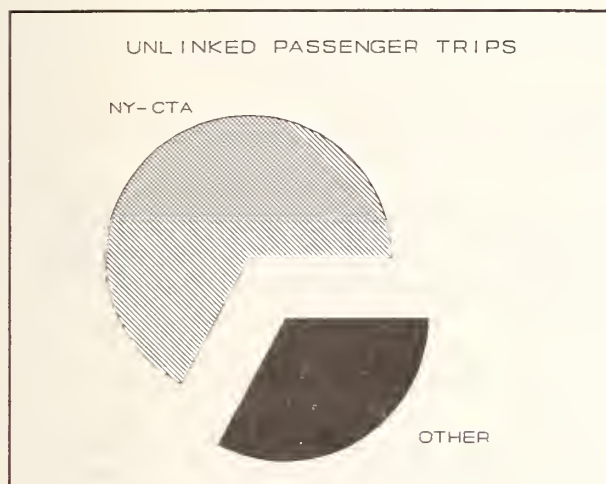
**MOTOR BUS SERVICE UTILIZATION
BY SYSTEM SIZE
SECTION 15 1987**

TRIPS AND MILES IN MILLIONS

FLEET SIZE-->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER	ALL SYSTEMS
<u>UNLINKED PASSENGER TRIPS</u>								
DIRECTLY OPERATED	106.3	210.9	166.8	542.7	816.4	817.8	2,085.3	4,746.3
PURCHASED	16.0	1.3	9.9	7.1	1.0	7.8	4.9	48.0
TOTAL	122.3	212.2	176.7	549.8	817.4	825.6	2,090.2	4,794.3
<u>ANNUAL PASSENGER MILES</u>								
DIRECTLY OPERATED	346.7	687.7	729.4	2,304.1	2,972.7	3,276.5	6,493.8	16,810.7
PURCHASED	119.5	5.7	37.5	70.1	6.0	45.3	0.0	284.2
TOTAL	466.2	693.4	766.9	2,374.2	2,978.7	3,321.8	6,493.8	17,094.9
SYSTEMS REPORTING	180	77	40	47	21	12	6	383

- o There was some growth in passenger miles (5 percent) in the rapid rail systems when examined as a unit because the New York CTA system simply dominates the statistics. New York accounted for 61.3 percent of the rail passenger miles and 67.2 percent of the passenger trips.
- o However, in examining what occurred between 1986 and 1987, there were two systems (BART and Baltimore which had decreases in passenger miles between 6 and 7 percent while other systems experienced increases of 3 to 6 percent, PATH experienced increases of 12 percent, Miami 17 percent and SEPTA 21 percent in 1987 over 1986.
- o There was significant growth in passenger trips in 1987 over 1986 at SEPTA with 9 percent, WMATA with 10 percent, PATH with 31 percent and Miami with 33 percent. Other systems had increases in the 1 to 4 percent ranges while BART and Cleveland had decreases in passenger trips of 6 to 7 percent in 1987 over 1986.
- o In 1987 NYCTA accounted for 62.8 percent of total U.S. national rapid rail vehicles. Chicago, the second largest system, accounted for 12.0 percent of the rapid rail vehicles. The other 10 systems accounted for 1,949 rapid rail vehicles, 25.2 percent of the total national fleet.
- o BART system passengers, on average, traveled greater distances per trip (11.5 miles) than passengers on other rapid rail systems in 1987; PATCO system passengers had the second longest trip distances, averaging 8.7 miles per trip. Miami and Cleveland RTA trips also tended to be longer than average with trip lengths of 7.8 and 7.2 miles, respectively.
- o The average trip length was between 3.0 miles and 5.4 miles. Thus, while BART was serving 2.5 percent of all unlinked rapid rail passengers trips, the BART system accounted for 6.2 percent of rapid rail passenger miles.

RAPID RAIL SERVICE UTILIZATION BY SYSTEM SECTION 15 1987



RAPID RAIL SERVICE UTILIZATION
BY SYSTEM
SECTION 15 1987

	FLEET SIZE	(THOUSANDS) UNLINKED PASS TRIPS	(THOUSANDS) PASSENGER MILES
New York CTA	4,857	1,613,759.8	6,863,460.0
Chicago-CTA	925	148,213.3	983,052.8
Washington Metro Area TA	456	160,366.8	871,705.9
San Francisco BART	338	60,304.4	695,944.3
Philadelphia - SEPTA	298	96,692.5	487,912.7
Boston - MBTA	260	148,058.8	450,098.7
New York - PATH	241	70,451.0	306,030.1
Atlanta - MARTA	115	66,098.0	285,216.6
Lindenwood - PATCO	90	10,822.3	94,096.5
Miami-Dade Cnty TA	74	10,187.9	79,873.0
Baltimore-MTA	42	11,883.4	42,416.9
Cleveland RTA	35	5,294.9	38,169.2
ALL SYSTEMS	7,731	2,402,133.1	11,197,976.7

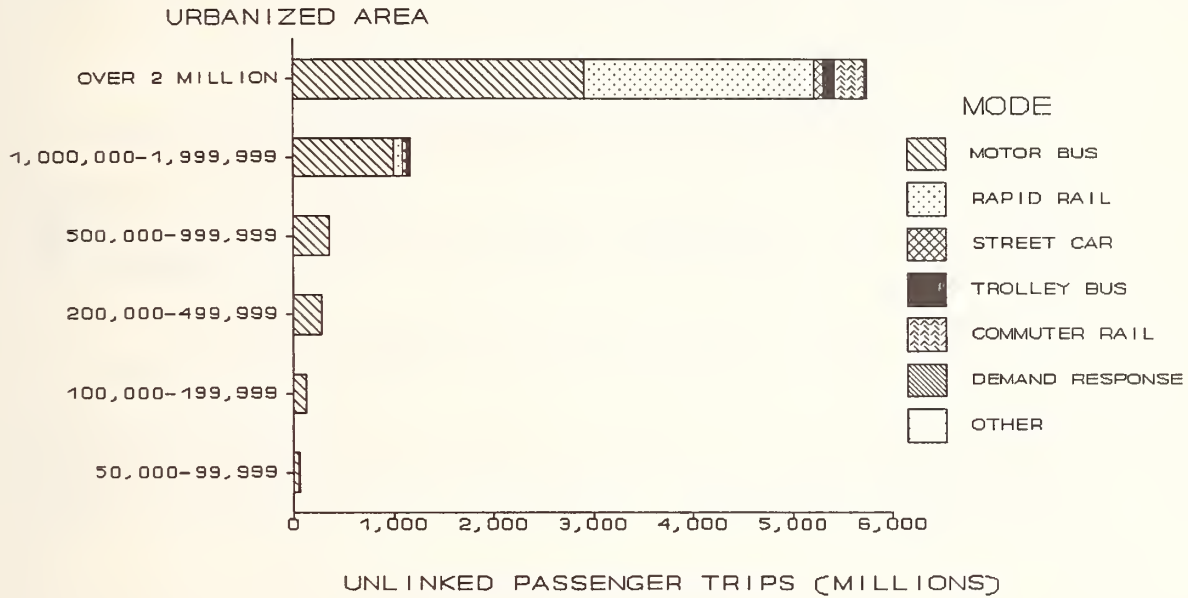
- o Transit systems in urbanized areas with 2 million or more residents (i.e., systems that Federal operating assistance in 1987 represent 4.8 percent of their operating revenue) accounted for:
 - 74.0 percent of passenger trips.
 - 60.3 percent of all public transit vehicle revenue hours.

- o Transit systems in urbanized areas with between 1 and 2 million inhabitants (i.e., systems that Federal operating assistance in 1987 represented 8.5 percent of their operating revenue) accounted for:
 - 15.2 percent of passenger trips.
 - 18.7 percent of all public transit vehicle revenue hours.

- o Transit systems in urbanized areas with between 200,000 and 1 million inhabitants (i.e., systems that Federal operating assistance in 1987 represented 17.7 percent of their operating revenue) accounted for:
 - 8.4 percent of passenger trips.
 - 14.7 percent of all public transit vehicle revenue hours.

- o Transit systems in urbanized areas with less than 200,000 thousand inhabitants (i.e., systems that Federal operating assistance in 1987 22.1 percent of their operating revenue) accounted for:
 - 2.5 percent of passenger trips.
 - 6.3 percent of all public transit vehicle revenue hours.

UNLINKED PASSENGER TRIPS
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987

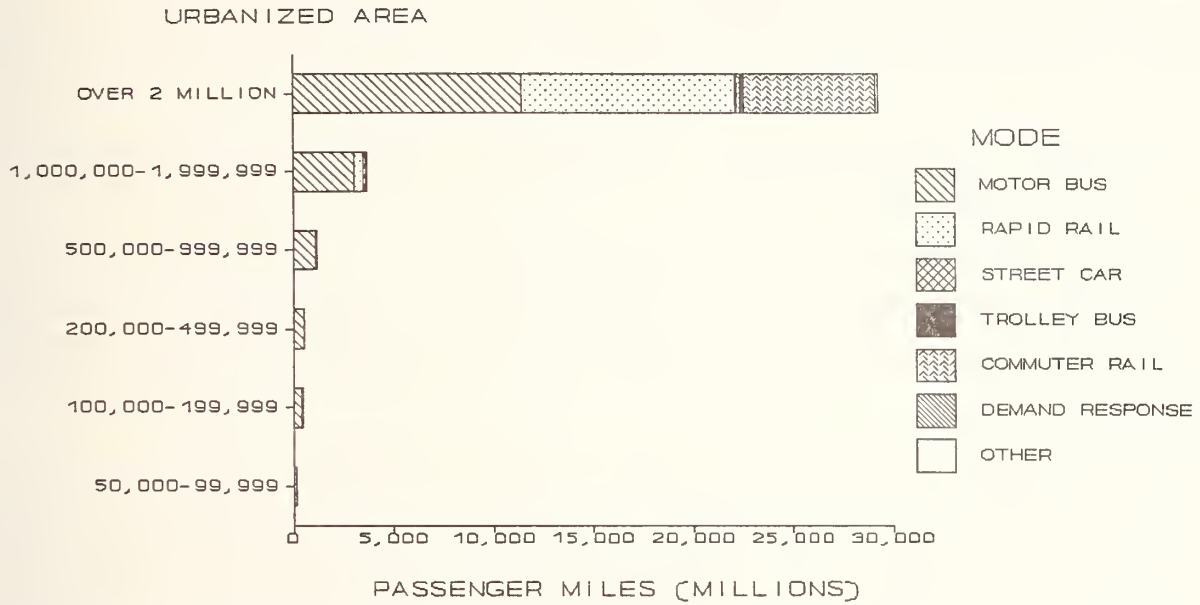


UNLINKED PASSENGER TRIPS
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987

Population -->	MILLIONS OF TRIPS						TOTAL
	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	
MOTOR BUS	56.9	130.6	281.6	359.5	1,007.5	2,910.2	4,746.3
RAPID RAIL	0.0	0.0	0.0	0.0	93.5	2,308.6	2,402.1
STREET CAR	0.0	0.0	0.0	0.6	35.6	95.1	131.3
TROLLEY BUS	0.0	0.0	0.0	5.7	18.6	116.5	140.8
COMMUTER RAIL	0.0	0.0	0.0	0.0	0.0	301.8	301.8
DEMAND RESPONSE	1.5	1.4	2.4	1.3	0.7	2.1	9.4
OTHER	0.1	0.8	0.4	0.3	21.5	14.4	37.5
TOTAL PASS TRIPS	58.4	132.8	284.4	367.5	1,177.3	5,748.7	7,769.2

- o Transit systems in urbanized areas with 2 million or more residents (i.e., systems that Federal operating assistance in 1987 represented 4.8 percent of their operating revenue) accounted for:
 - 82.8 percent of public transit passenger miles.
 - 60.3 percent of all public transit vehicle revenue hours.
- o Transit systems in urbanized areas with between 1 and 2 million residents (i.e., systems that Federal operating assistance in 1987 represented 8.5 percent of their operating revenue) accounted for:
 - 10.4 percent of public transit passenger miles.
 - 18.7 percent of all public transit vehicle revenue hours.
- o Transit systems in urbanized areas with between 200,000 and 1,000,000 residents (i.e., systems that Federal operating assistance in 1987 that represented 17.7 percent of their operating revenue) accounted for:
 - 4.9 percent of public transit passenger miles.
 - 14.7 percent of all public transit vehicle revenue hours.
- o Transit systems in urbanized areas with less than 200,000 residents (i.e., systems that Federal operating assistance in 1987 represented 22.1 percent of their operating revenue) accounted for:
 - 1.9 percent of public transit passenger miles.
 - 6.3 percent of all public transit vehicle revenue hours.
- o In 1987 transit systems in urbanized areas with 2 million or more residents accounted for:
 - All passenger miles traveled on commuter rail.
 - 96.0 percent of the passenger miles traveled by rapid rail.
 - 92.0 percent of the passenger miles traveled by trolley bus.
 - 59.3 percent of the passenger miles traveled on streetcars.
 - 68.0 percent of the passenger miles traveled on motor bus.
 - 47.2 percent of the miles traveled on demand response transit.

PASSENGER MILES
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987



PASSENGER MILES
BY MODE AND URBANIZED AREA SIZE
SECTION 15 1987

MILLIONS OF MILES

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
MOTOR BUS	184.2	440.0	554.1	1,160.7	3,041.3	11,430.3	16,810.7
RAPID RAIL	0.0	0.0	0.0	0.0	445.7	10,752.3	11,198.0
STREET CAR	0.0	0.0	0.0	3.5	161.0	239.9	404.4
TROLLEY BUS	0.0	0.0	0.0	14.5	3.4	204.8	222.7
COMMUTER RAIL	0.0	0.0	0.0	0.0	0.0	6,540.1	6,540.1
DEMAND RESPONSE	10.9	10.1	13.3	0.0	3.3	33.6	71.2
OTHER	2.0	23.0	1.3	0.0	28.8	129.5	184.6
TOTAL PASS MILES	197.1	473.1	568.7	1,178.8	3,683.5	29,330.6	35,431.6



CHAPTER III - PERFORMANCE MEASURES

OVERVIEW

This chapter examines performance measures that are relevant to transit industry performance. Performance measures are derived indicators that typically relate service input factors to service output and utilization factors. As such, they are broad barometers of transit efficiency and effectiveness. It is important, however, to emphasize that performance measures offer only general insights into transit industry performance: to rely on performance measures alone for an understanding of industry efficiency and effectiveness can result in misleading conclusions.

This chapter is divided into two subsections. The first contains industry-wide measures and, where relevant, urbanized area measures for each mode.

The second subsection focuses exclusively on motor bus performance for fiscal year 1987 and examines that performance under the seven Section 15 fleet size categories. In 1984 the computations were done using a methodology designed to reduce the statistical impact of the large systems on the ratios. In 1985 to 1987 the method changed and is now designed to examine the motor bus industry as a whole without any smoothing statistical methods.

The motor bus focus is prompted by two interrelated factors. First and foremost, motor bus systems provide most of public transportation in the United States, supplying over 65 percent of all vehicle revenue miles of service and furnishing 61 percent of all public transportation passenger trips. Second, no other fixed-route public transit mode (see Table III-1) embraces enough systems to permit development of meaningful fleet-size performance statistics.¹

PERFORMANCE MEASURES

Within each of the two subsections, two general types of performance measures are featured: 1) Benchmark Performance Measures and 2) Issue Oriented Measures. Benchmark Measures are fundamental indicators employed from year to year to gauge transit industry performance and provide the continuity needed to track key industry trends. Issue Oriented Measures, by contrast, are more topical and seek to respond to the major policy performance issues and concerns facing UMTA. Measures selected for this group may or may not change from year to year, depending on the issues that emerge.

All of the measures in this chapter are of the performance of directly operated

¹ Although 261 demand response systems reported under the Section 15 Program in 1987, they operated under very diverse service and contractual arrangements. This made it impossible to form valid fleet size groupings for examining the performance of these systems. Many of these systems, moreover, operated through purchase-of-service contracts, and their reports, therefore, did not fully reflect service costs.

TABLE III-1
PUBLIC TRANSPORTATION FIXED-ROUTE MODES
1987 SECTION 15 REPORTERS
BY
MODE AND FLEET SIZE

SIZE -->	UNDER 25	25-49	50-99	100- 249	250- 499	500- 999	1000 & OVER	ALL SYSTEMS
MOTOR BUS	180	77	40	47	21	12	6	383
RAPID RAIL	0	2	2	2	4	1	1	12
STREET CAR	7	1	1	3	0	0	0	12
TROLLEY BUS	1	0	2	1	1	0	0	5
COMMUTER RAIL	1	2	2	4	2	2	1	14

transit services, unless noted. As pointed out in Introduction to the Compendium, the exclusion of most purchased service costs represents a departure from past practices, a departure that allows a more accurate representation of transit service costs and operational characteristics for directly operated services.

Benchmark Performance Measures

The Benchmark Measures fall into three performance categories:

- o Cost Efficiency - The amount of public transportation service produced in relation to the resources expended. This measure attempts to answer the question, "How much public transportation service is produced per dollar of resource expended?" Amounts of service produced are measured in terms of service outputs such as vehicle hours or vehicle miles. Resources expended include labor, capital, materials, and services. The fewer resources expended per service unit produced the greater the resource efficiency of the public transportation service.
- o Service Effectiveness - The consumption of public transportation service in relation to the amount of service available. This attempts to answer the question, "How much public transportation service is consumed (or revenue received), at an established fare, in relation to the amount of service available?" Factors reflecting service quality and influencing the use of and perceptions about public transportation services by the public are important elements of service effectiveness.
- o Cost Effectiveness - The consumption of public transportation services in relation to resources expended. This attempts to answer the question, "How much public transportation service is used or passenger revenue received per dollar or resources expended?" Consumption is measured by passenger trips, passenger miles, or revenues received and, as above, costs are measured in terms of resources expended to produce the public transportation service. The more passengers carried or revenues received in relation to resources expended, the more cost-effective the service.

These categories encompass the key elements of transit service performance and are commonly used to examine transit industry and system performance.

Within each of these general categories, several related measures are used to reflect transit performance. Like the general performance categories, these measures will be employed every year to allow analysts to follow key industry trends.

Issue-Oriented Measures

The 1987 Compendium features four groups of issue-oriented measures, each addressing a major area of policy and management concern. The four groups are:

- o Labor Efficiency & Utilization - These measures address labor efficiency issues, focusing on the relationship between labor inputs and service outputs.
- o Materials & Utilities Efficiency - These measures relate the cost of material use and utility consumption to vehicle miles of service output.
- o Functional Efficiency - These measures focus on the cost of vehicle operations, vehicle maintenance, non-vehicle maintenance, and general administration in relation to service outputs including vehicle revenue hours and vehicle miles.
- o Fleet Control Measures - These measures relate vehicle output to total active fleet vehicles, and focus on fleet utilization issues.
- o Safety Measures - These measures seek to gauge service safety by relating the number of accidents to vehicle miles and hours.²

For each group, efforts have been made to supply a "current" performance picture by using 1987 statistics. In addition, industry and modal performance over time is shown by citing performance indices from the previous 4 years.

PATTERNS AND TRENDS

Following are descriptions of some of the key patterns and trends highlighted in the tables and charts in this chapter.

Industry-Wide Benchmark Measures

- o Trolley bus showed the lowest ratio of operating expenses per vehicle

² The term "accident" here embraces collision accidents only, which is directly related to vehicle operations. Collision accidents refer to accidents, fatalities, or injuries that occurred as a consequence of the collision of the transit system's revenue vehicles with persons, objects, or other vehicles.

revenue hour (\$36.81).

- o Demand response services had the highest ratio of operating expenses per passenger services (\$20.19) and operating expenses per passenger mile (\$2.76).
- o Commuter rail services reported the highest ratio of operating expenses per revenue hour (at \$333.15) and per revenue mile (at \$10.48). Motor bus reported the lowest ratio of operating cost per revenue mile (at \$4.28).
- o The average annual percentage increases (+) and decreases (-) in operating costs per vehicle revenue hour between 1983 and 1987 are listed below by mode in ascending order*:
 - Trolley bus - -5.9 percent.
 - Rapid rail - +1.8 percent.
 - Streetcar - +2.9 percent.
 - Motor bus - +4.1 percent.
 - Demand Response - +8.8 percent.
- o The values for operating expense per vehicle revenue hour increased with urbanized area size. In 1987 the largest urbanized areas had the highest operating expense per vehicle revenue hour, about 4 times greater than the urbanized areas with 50,000 to 99,999 residents, which had the lowest operating expense per vehicle revenue hour at \$27.85.
- o Demand response consistently had the lowest unlinked passenger trips per vehicle revenue hour in the 1983 to 1987 period with virtually no change.
- o None of the four fixed route modes reported consistent increases or decreases in passenger trips per hour between 1983 and 1987.
- o Overall, there was a 12.3 percent increase in farebox revenue per vehicle revenue hour in 1987 over 1986.
- o Despite variations in the farebox revenue per unlinked passenger trip, the amount of farebox revenues generated per passenger mile was relatively constant across urbanized area groups in 1987. Variations in the value of this indicator do not reflect a pattern related to urbanized area size.
- o Of the 5 major fixed route modes, commuter rail was by far the most expensive in terms of cost per passenger trip between 1984 and 1987. Yet, because of the long distances traveled by the typical commuter rail passenger, commuter rail was one of the less expensive modes in terms of cost per passenger mile (\$0.26).

- o Federal subsidy per passenger trip, which amounted to \$0.12 in 1987 and which was a 2 percent increase over 1986, tended to decrease as urbanized area population increased:
 - Transit systems in urbanized areas with 2 million or more residents received \$0.08 per passenger trip.
 - Transit systems in urbanized areas with between 1 and 2 million residents received \$0.14 per passenger trip.
 - Transit systems in urbanized areas with between 200,000 and 1 million residents received \$0.27 per passenger trip.
 - Transit systems in urbanized areas with less than 200,000 residents received \$0.41 per passenger trip.
- o State and local subsidies per passenger trip overall was \$0.77 or six times the federal subsidy per passenger trip. In the smallest urbanized areas (with less than 200,000 residents) state subsidies per passenger trip were about twice the federal subsidies. In the largest urbanized areas (with more than 2 million residents) state and local subsidies per passenger trip were over 10 times federal subsidies.
- o In 1987 the largest urbanized areas financed the highest proportion of their operating expenses through passenger fares (49 percent). Urbanized areas with between 200,000 and 2 million residents financed about one-third of their operating costs through passenger fares. Urbanized areas with less than 200,000 residents financed between 24 and 28 percent of their operating costs with passenger fares.

Industry-Wide Issue Oriented Measures

- o The labor expenses per hour of service were much higher for rail than non-rail modes of transit service.
- o Fringe benefits expense added between 25 and 38 percent to the labor cost per revenue hour of service.
- o Demand response systems produced the most vehicle revenue hours per equivalent employee (1,026.5) in 1987.
- o Motor bus, rapid rail, trolley bus, and streetcar each reported vehicle operations expense per vehicle revenue hour of between \$30 and \$40. Motor bus and rapid rail had increases in expenses per vehicle revenue hour of 1 percent and 9 percent respectively while streetcar and trolley bus had decreases of 3 percent and 5 percent respectively in 1987 over 1986.
- o From 1983 to 1987, maintenance expenses per vehicle hour increased annually for all modes.
 - Motor bus maintenance expenses per vehicle hour increased at an average annual rate of 5.0 percent.

- Rapid rail maintenance expenses per vehicle hour increased at an average annual rate of 6.0 percent.
 - Streetcar maintenance expenses per vehicle hour increased at an average annual rate of 8.3 percent.
 - Trolley bus maintenance expenses per vehicle hour increased at an average annual rate of 7.7 percent.
 - Demand response maintenance expense per vehicle hour increased at an average annual rate of 4.8 percent.
- o Rapid rail, which reported that its general administration expenses represented 31.9 percent (the highest among all modes) of its operating costs has the second highest general administration expenses per vehicle revenue hour at \$42.48 behind commuter rail which spent \$53.78 per vehicle revenue hour.
 - o The ratio of the total active fleet vehicles and the vehicles in maximum scheduled service measures the relative size of a transit system's spare fleet. Three of the modes (motor bus, rapid rail, and commuter rail) reported a spare fleet of about 30 to 34 percent. Streetcar reported a spare fleet of 47 percent, trolley bus had a 53 percent spare fleet, and demand response reported a spare fleet of about 197 percent.
 - o Rapid Rail recorded the highest vehicle miles per active vehicle with 47,365, even though there was a decrease from 1986 to 1987. Commuter rail remained second highest with annual vehicle miles per active vehicle of 34,959.

Motor Bus Issue Oriented Measures

- o Motor bus system operating expenses per revenue mile or hour (a resource efficiency indicator) typically increased (i.e. worsened) as fleet size increased.
- o Average service effectiveness, as measured in unlinked passenger trips per revenue mile and hour, tended to increase (i.e. improve) with fleet size group. In 1987, passenger trips per vehicle revenue mile for the group of largest motor bus systems was over 3.3 times the average for the group of smallest motor bus systems.
- o There was an across the board decline in both trips per mile and trips per hour in the range of 2 percent to 9 percent in 1987.
- o Revenue vehicle operators of smaller motor bus systems tended to drive more annual vehicle miles and hours than did operators of larger motor bus systems. For example, operators of motor bus systems with fleet sizes of less than 25 vehicles drove 54.7 percent more annual miles and 27.1 percent hours miles in 1987 than did operators of the largest motor bus systems.

- o Motor bus systems with over 1,000 vehicles had the smallest average spare ratio (20 percent) and motor bus systems with less than 25 vehicles had the largest average spare ratio (37 percent). However, there was not much change in most systems in 1987 over 1986.
- o No clear pattern of variation existed among motor bus fleet size average statistics for miles or hours of service per active vehicle. On average motor bus systems seem to have operated their vehicles between 27,000 and 33,000 miles per year. Average measures for vehicle hours per active vehicle suggest slower operating speeds by the largest systems.



III. TRANSIT INDUSTRY
PERFORMANCE MEASURES



A. BENCHMARK PERFORMANCE MEASURES

o The motor bus and demand response modes were the only modes in which operating costs per vehicle revenue hour increased each year. The trend between 1983 and 1987 was that the transit modes experienced increases in their operating costs per vehicle revenue hour even though rapid rail, streetcar, and trolley bus reduced their operating costs per revenue hour in 1984 and trolley bus reduced its costs per vehicle hour again in 1987.

o The average annual percentage increases (+) and decreases (-) in operating costs per vehicle revenue hour between 1983 and 1987 are listed below by mode in ascending order*:

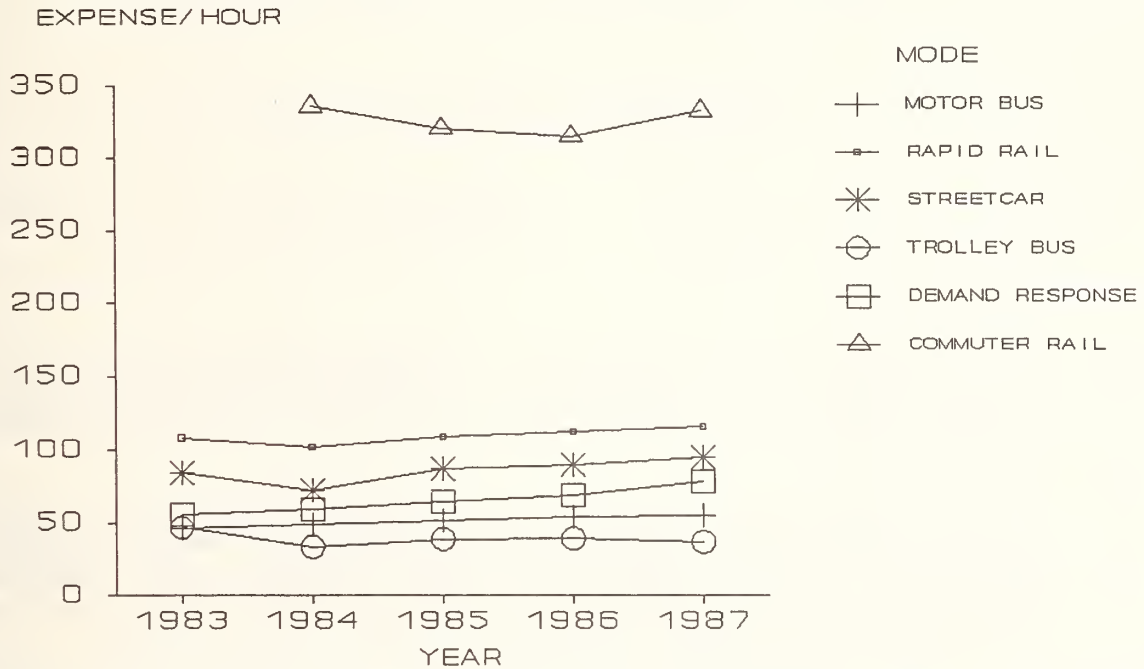
--	Trolley bus	-	-5.9 percent.
--	Rapid rail	-	+1.8 percent.
--	Streetcar	-	+2.9 percent.
--	Motor bus	-	+4.1 percent.
--	Demand Response	-	+8.8 percent.

o Except for trolley bus which experienced a decrease in operating expenses per vehicle revenue hour between 1986 and 1987, all other modes had increases:

--	Trolley bus	-	-6.0 percent.
--	Motor bus	-	+1.5 percent.
--	Rapid rail	-	+3.3 percent.
--	Street car	-	+4.8 percent.
--	Demand response	-	+13.9 percent.

*Commuter rail is not included because data does not cover the five year time period.

TRANSIT INDUSTRY COST EFFICIENCY TRENDS
 OPERATING EXPENSE PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY COST EFFICIENCY TRENDS
 OPERATING EXPENSES PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1983-1987

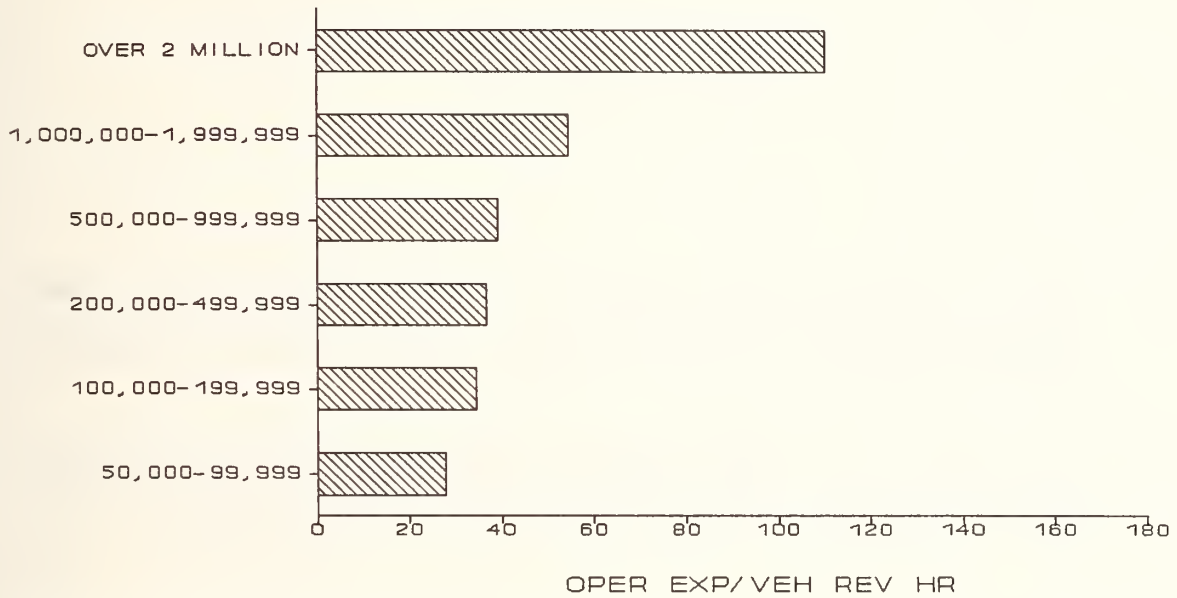
	1983	1984	1985	1986	1987
MOTOR BUS	46.70	48.92	51.60	53.93	54.75
RAPID RAIL	108.40	101.95	108.90	112.34	115.99
STREET CAR	84.50	72.68	87.20	90.25	94.62
TROLLEY BUS	46.90	33.43	38.90	39.14	36.81
DEMAND RESPONSE	55.90	59.73	64.70	68.73	78.30
COMMUTER RAIL	N/A	335.58	320.70	315.20	333.15

(DOLLARS)

- o The indicator on the facing page measures the operating cost of transit services per vehicle hour of service, excluding deadhead travel time.
- o The values for this indicator increased with urbanized area size. In 1987 the largest urbanized areas had the highest operating expense per vehicle revenue hour, about 4 times greater than the urbanized areas with 50,000 to 99,999 residents, which had the lowest operating expense per vehicle revenue hour at \$27.85.
- o All areas experienced operating expense per vehicle revenue hour reductions in 1987 over 1986, generally in the range of 12-23 percent.

TRANSIT INDUSTRY COST EFFICIENCY
 OPERATING EXPENSE PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987

URBANIZED AREA



TRANSIT INDUSTRY COST EFFICIENCY
 OPERATING EXPENSE PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
OPER EXPENSE/VEH REV HOUR	27.85	34.52	36.82	39.18	54.67	110.35	81.98

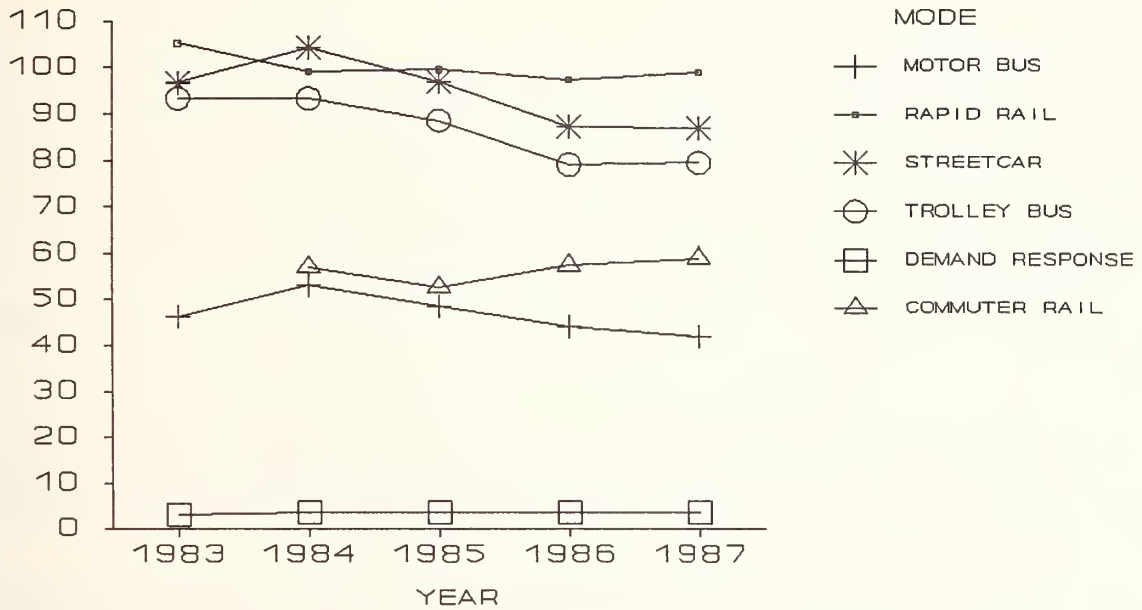
(Dollars)

- o Demand response provided transit for specialized trips in the least dense travel markets. Consequently, it consistently had the lowest unlinked passenger trips per vehicle revenue hour in the 1983 to 1987 period with virtually no change.
- o None of the four fixed route modes reported consistent increases or decreases in passenger trips per hour between 1983 and 1987. Rather, each mode reported fluctuations during the five years**.

** Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS
UNLINKED PASSENGER TRIPS PER VEHICLE REVENUE HOUR
BY MODE
SECTION 15 1983-1987

UNL PASS TRIPS/VEH REV HR



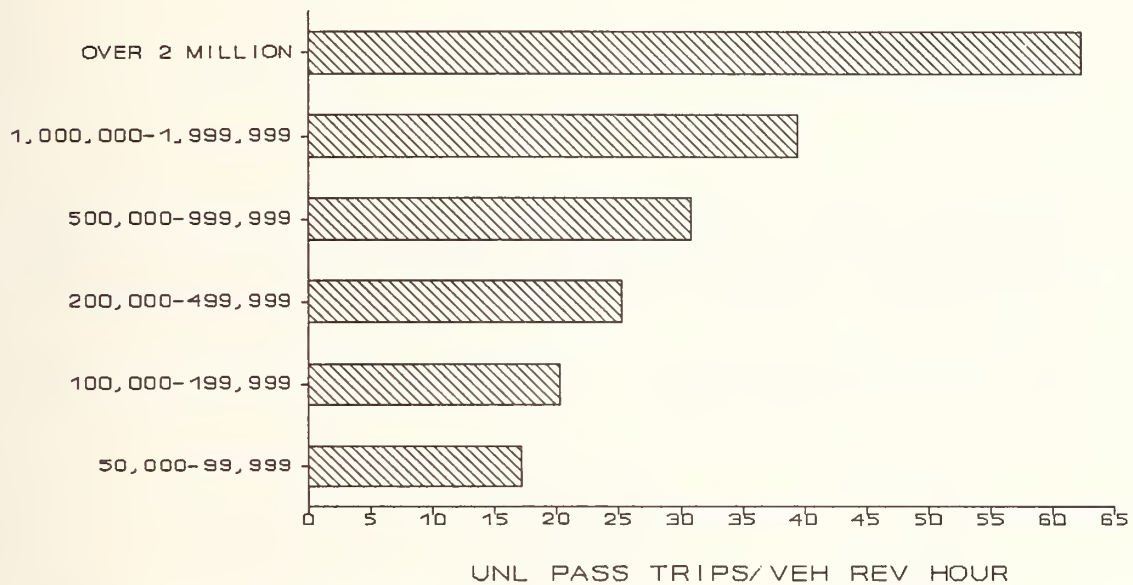
TRANSIT INDUSTRY SERVICE EFFECTIVENESS
UNLINKED PASSENGER TRIPS/VEHICLE REVENUE HOUR
BY MODE
SECTION 15 1983-87

	1983	1984	1985	1986	1987
MOTOR BUS	46.4	53.0	48.6	44.1	42.0
RAPID RAIL	105.2	99.1	99.5	97.4	99.0
STREET CAR	96.6	104.3	96.8	87.4	87.1
TROLLEY BUS	93.3	93.2	88.5	79.1	79.5
DEMAND RESPONSE	3.2	3.6	3.6	3.6	3.7
COMMUTER RAIL	N/A	56.9	52.6	57.4	58.9

- o On average, transit systems provided 52.3 unlinked passenger trips per vehicle revenue hour. Transit systems had 2 percent fewer trips per vehicle revenue hour in 1987 than 1986.
- o The smallest urbanized areas provided the fewest trips per hour 17.2 which is a 13 percent reduction in trips per hour in 1987 than 1986.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 UNLINKED PASSENGER TRIPS PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987

URBANIZED AREA



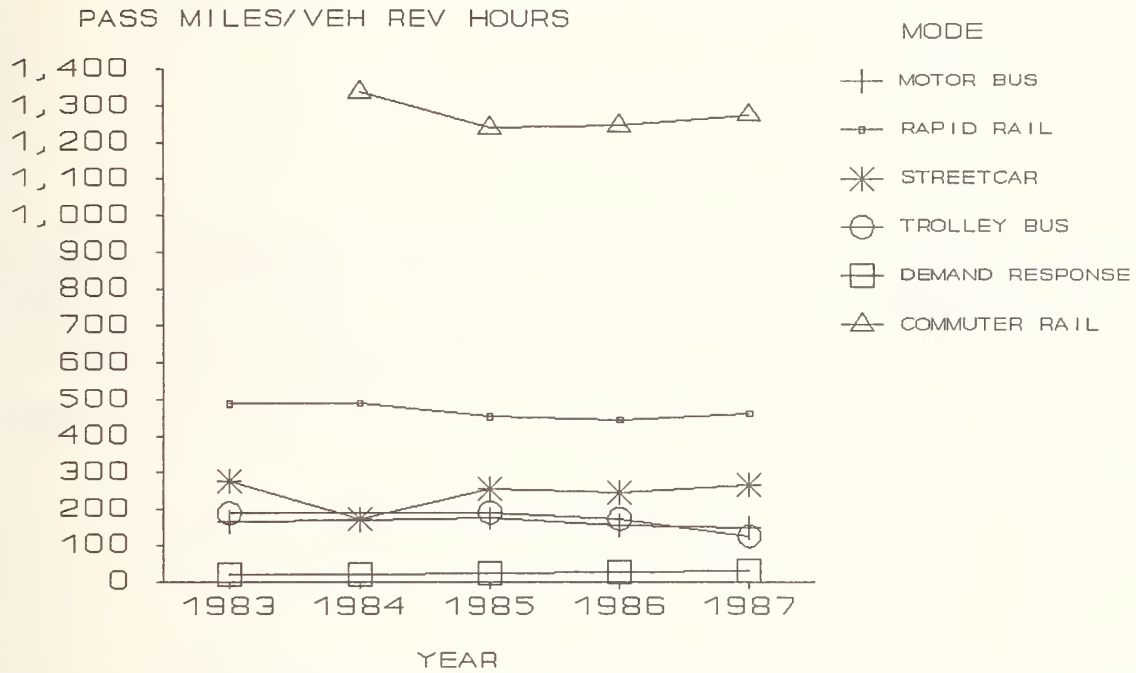
TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 UNLINKED PASSENGER TRIP PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
UNL PASS TRIP/VEH REV HOURS	17.2	20.3	25.3	30.9	39.5	62.4	52.3

- o From 1983 to 1987, transit industry service effectiveness trends, as measured in passenger miles per vehicle revenue hour, fluctuated for all modes. Demand response showed some increase in this measure of service effectiveness. All other modes showed some decline.
- o The average annual increase and decrease for each of the modes between 1983 and 1987 was*:
 - Motor bus - -2.6 percent.
 - Rapid rail - -1.4 percent.
 - Streetcar - -0.6 percent.
 - Trolley bus - -9.7 percent.
 - Demand response - +7.7 percent.

* Data on commuter rail service were only available for 1984 to 1987.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS TRENDS
 PASSENGER MILES PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1987



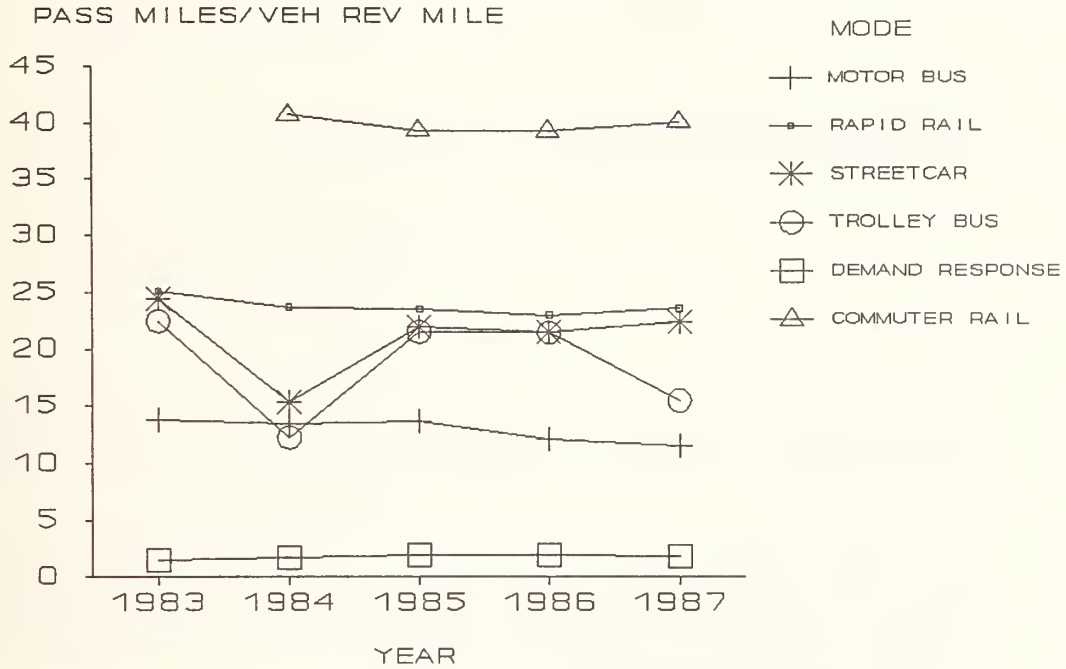
TRANSIT INDUSTRY SERVICE EFFECTIVENESS TRENDS
 PASSENGER MILES PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	165.6	170.7	174.6	156.7	148.9
RAPID RAIL	487.7	488.9	453.0	444.5	461.3
STREETCAR	275.7	171.7	257.9	244.5	268.2
TROLLEY BUS	189.3	30.8	191.4	173.5	125.7
DEMAND RESPONSE	21.1	21.4	24.2	25.8	28.4
COMMUTER RAIL	N/A	1,337.5	1,239.9	1,247.3	1,276.1

- o From 1983 to 1987, transit industry service effectiveness trends, as measured in passenger miles per vehicle revenue mile (average passenger load), fluctuated for all modes. Motor bus and trolley bus were declining while the other modes were generally static.
- o The average annual increase and decrease for each of the modes between 1983 and 1987 was*:
 - Motor bus - -4.1 percent.
 - Rapid rail - -1.4 percent.
 - Streetcar - -2.1 percent.
 - Trolley bus - -8.9 percent.
 - Demand response - +5.0 percent.

* Data on commuter rail service were only available for 1984 to 1987.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS TRENDS
 PASSENGER MILES PER VEHICLE REVENUE MILE
 BY MODE
 SECTION 15 1982-1987

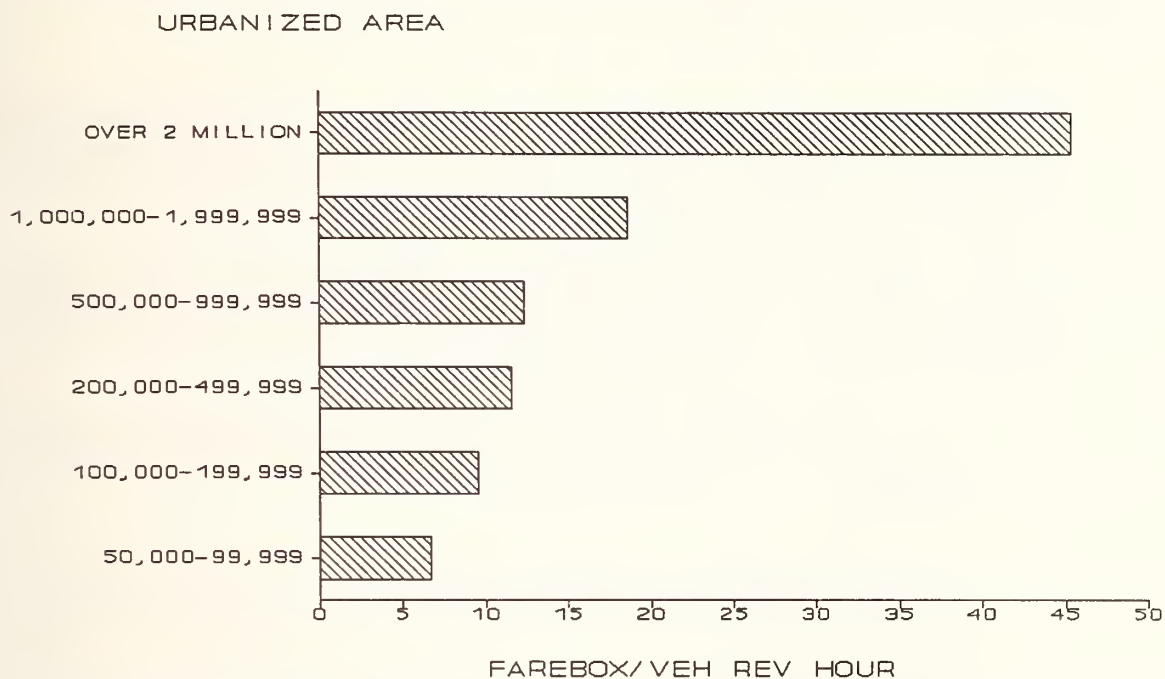


TRANSIT INDUSTRY SERVICE EFFECTIVENESS TRENDS
 PASSENGER MILES PER VEHICLE REVENUE MILE
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	13.8	13.5	13.7	12.2	11.6
RAPID RAIL	25.1	23.7	23.5	23.0	23.6
STREET CAR	24.5	15.4	22.0	21.5	22.4
TROLLEY BUS	22.5	12.3	21.5	21.5	15.5
DEMAND RESPONSE	1.6	1.7	2.0	2.0	1.9
COMMUTER RAIL	N/A	40.7	39.3	39.2	40.1

- o Farebox revenue per vehicle revenue hour measures the amount of money taken in by transit systems per hour that service is provided to the public, excluding deadhead travel time.
- o Since the larger transit systems carry more passengers and often have larger vehicles they have higher farebox revenue per vehicle revenue hour of service. The largest systems receive almost 6.8 times the farebox revenue per vehicle revenue hour as the transit systems in the smallest urbanized areas.
- o Overall, there was a 12.3 percent increase in farebox revenue per vehicle revenue hour in 1987 over 1986.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 FAREBOX REVENUE PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987



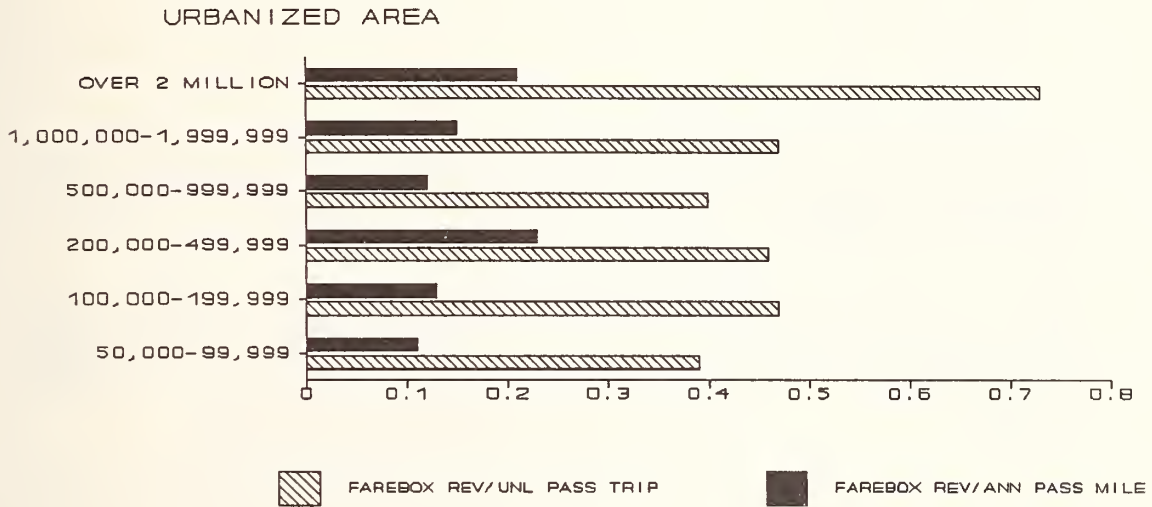
TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 FAREBOX REVENUE PER VEHICLE REVENUE HOUR
 BY URBANIZED AREA SIZE
 SECTION 15 1987

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
FAREBOX REV/VEH REV HOUR	6.71	9.58	11.60	12.36	18.63	45.44	34.51

(Dollars)

- o Farebox revenue per passenger trip is a measure of average passenger fare. This measure of average fare is always less than actual full fares since transfers count as separate trips and some passengers travel for reduced fare during all or part of the day.
- o Transit systems in larger urbanized areas generally received more farebox revenue per passenger trip than transit systems in smaller urbanized areas. In 1987, for example, transit systems in the largest urbanized areas garnered:
 - 55.3 percent more farebox revenue per passenger trip than systems in urbanized areas with 1 million to 1,999,999 residents.
 - 71.2 percent more farebox revenue per passenger trip than systems in urbanized areas with 200,000 to 999,999 residents.
 - 63.5 percent more farebox revenue per passenger trip than systems in urbanized areas with less than 200,000 residents.
- o Overall average farebox revenue per passenger trip was \$0.66. The highest average fare was \$0.73 in urbanized areas exceeding 2 million persons and the lowest average fare was just below \$0.39 in urbanized area of between 50,000 and 99,999 persons.
- o Despite variations in the farebox revenue per unlinked passenger trip, the amount of farebox revenues generated per passenger mile was relatively constant across urbanized area groups in 1987. Variations in the value of this indicator do not reflect a pattern related to urbanized area size.

TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 FAREBOX REVENUE PER UNLINKED PASSENGER TRIP
 AND ANNUAL PASSENGER MILE
 BY URBANIZED AREA SIZE
 SECTION 15 1987



TRANSIT INDUSTRY SERVICE EFFECTIVENESS
 FAREBOX REVENUE PER UNLINKED PASSENGER TRIPS AND ANNUAL PASSENGER MILES
 BY URBANIZED AREA SIZE
 SECTION 15 1987

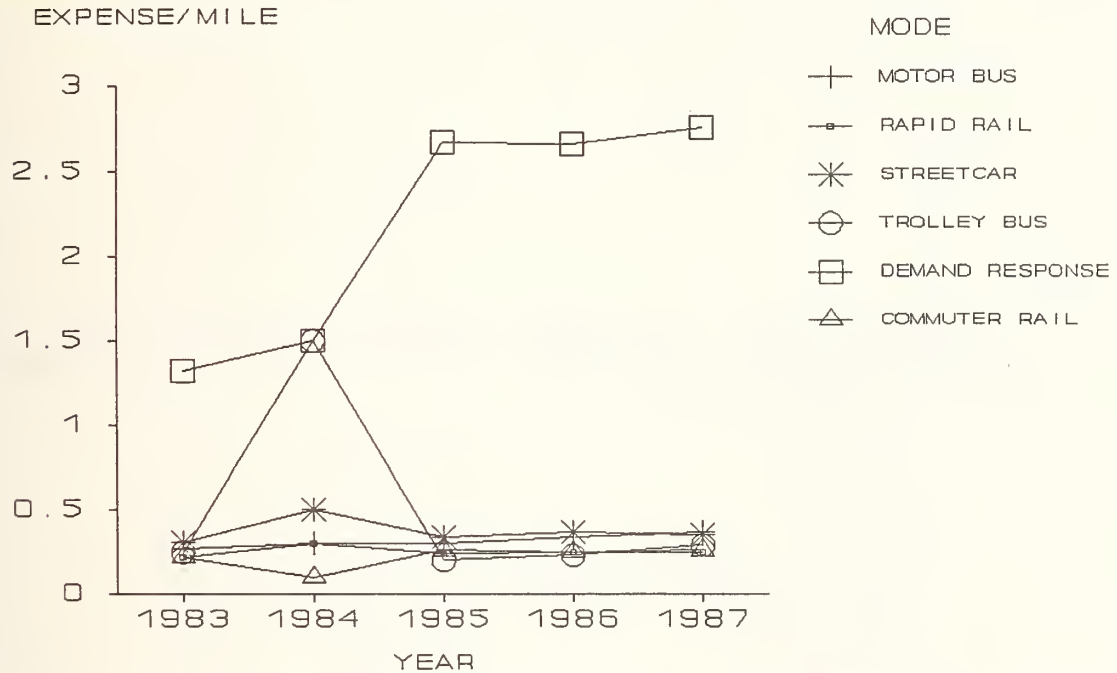
Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
FAREBOX REV/UNL PASS TRIP	0.39	0.47	0.46	0.40	0.47	0.73	0.66
FAREBOX REV/ANN PASS MILE	0.11	0.13	0.23	0.12	0.15	0.21	0.14

(Dollars)

- o Because of the long distances traveled by the typical commuter rail passenger, commuter rail was one of the less expensive modes in terms of cost per passenger mile (\$0.26).
- o With the exception of streetcar which reduced its costs per passenger mile by about 5 percent in 1987 over 1986, all other modes had increases in costs per passenger mile in the 3 to 6 percent range except for trolley bus which had increases of about 30 percent.
- o The average annual percentage increase in operating costs per passenger mile between 1983 and 1987 are listed below by mode in ascending order:

--	Streetcar	-	3.3 percent.
--	Rapid rail	-	3.4 percent.
--	Trolley bus	-	4.0 percent.
--	Commuter rail	-	4.4 percent.
--	Motor bus	-	8.0 percent.
--	Demand response	-	20.3 percent.

TRANSIT INDUSTRY COST EFFECTIVENESS TRENDS
 OPERATING EXPENSE PER PASSENGER MILE
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY COST EFFECTIVENESS TRENDS
 OPERATING EXPENSE PER PASSENGER MILE
 BY MODE
 SECTION 15 1983-1987

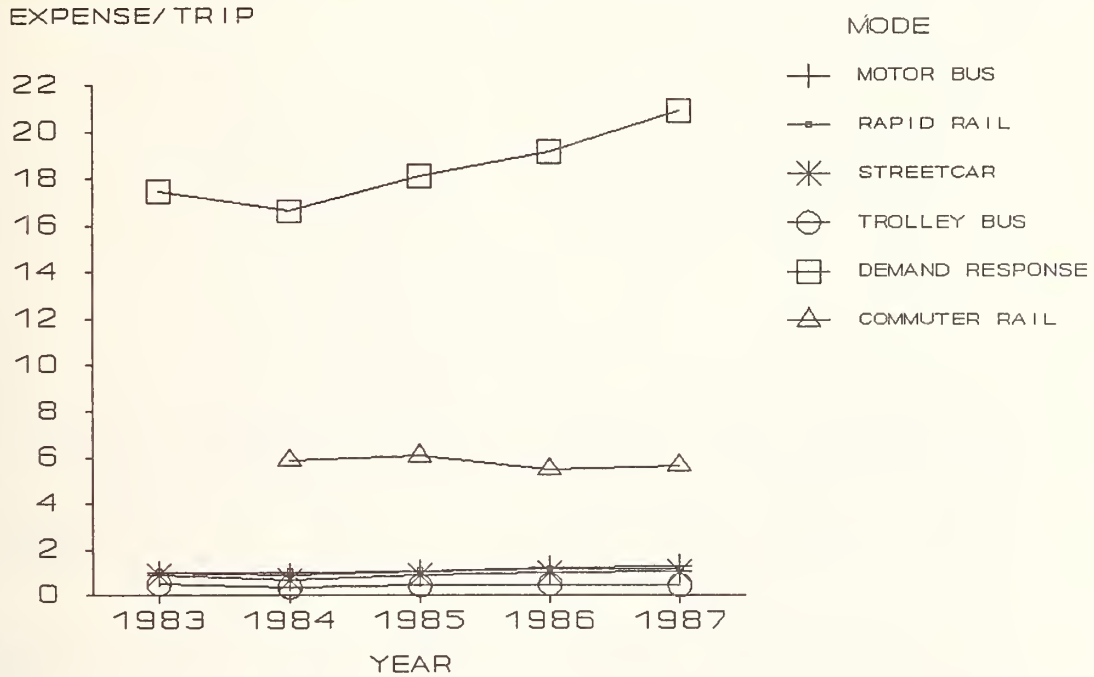
	1983	1984	1985	1986	1987
MOTOR BUS	0.27	0.30	0.30	0.34	0.37
RAPID RAIL	0.22	0.30	0.24	0.25	0.25
STREET CAR	0.31	0.50	0.34	0.37	0.35
TROLLEY BUS	0.25	1.50	0.20	0.23	0.29
DEMAND RESPONSE	1.32	1.50	2.67	2.66	2.76
COMMUTER RAIL	0.22	0.10	0.26	0.25	0.26

o The average annual percentage increases in operating costs per unlinked passenger trip between 1983 and 1987 are listed below by mode in ascending order*:

--	Trolley bus	-	- 2.1 percent.
--	Rapid rail	-	+ 3.2 percent.
--	Demand Response	-	+ 4.6 percent.
--	Street car	-	+ 5.5 percent.
--	Motor bus	-	+ 6.5 percent.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY COST EFFECTIVENESS
 OPERATING EXPENSE PER UNLINKED PASSENGER TRIP
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY COST EFFECTIVENESS TRENDS
 OPERATING EXPENSES PER UNLINKED PASSENGER TRIP
 BY MODE
 SECTION 15 1983-1987

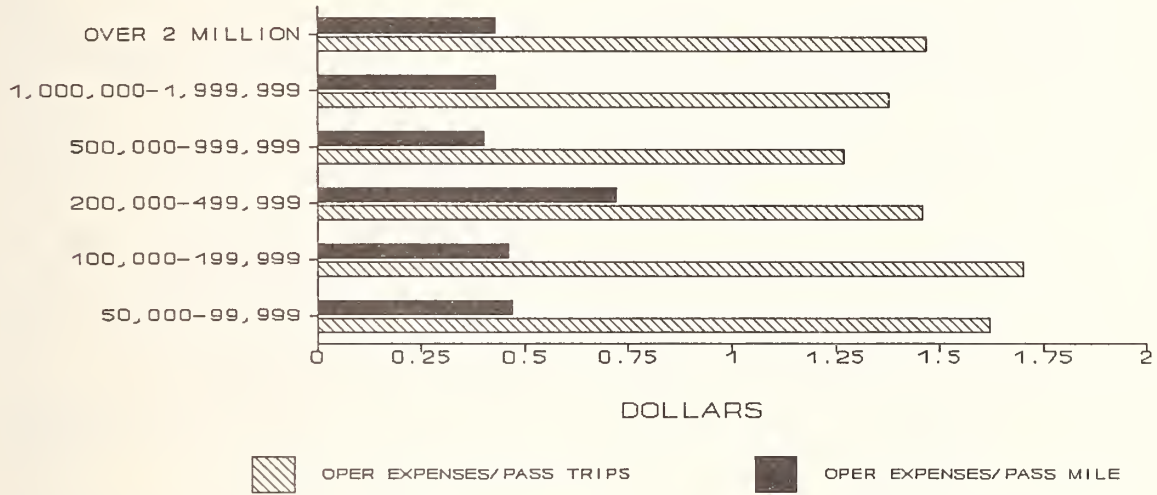
	1983	1984	1985	1986	1987
MOTOR BUS	1.01	0.92	1.06	1.22	1.30
RAPID RAIL	1.03	1.03	1.09	1.15	1.17
STREETCAR	0.88	0.70	0.90	1.03	1.09
TROLLEY BUS	0.50	0.36	0.44	0.49	0.46
DEMAND RESPONSE	17.44	16.62	18.11	19.14	20.91
COMMUTER RAIL	N/A	5.89	6.09	5.49	5.66

(Dollars)

- o Operating expenses per unlinked passenger trip ranged from \$1.27 in urbanized areas with 500,000 to 1 million residents to \$1.70 in urbanized areas with between 100,000 and 199,999 residents. The smallest and the largest urbanized areas experienced decreases of 3 to 12 percent in 1987 over 1986. The other areas had operating expenses per passenger trip increases between 4 and 12 percent.
- o All urbanized areas, except for those in the smallest urbanized areas experienced increases in their operating expenses per passenger mile in 1987 over 1986. These increases generally ranged from 12 percent to 34 percent.

TRANSIT INDUSTRY COST EFFECTIVENESS
 OPERATING EXPENSE PER UNLINKED PASSENGER TRIP AND PASSENGER MILE
 BY URBANIZED AREA SIZE
 SECTION 15 1987

URBANIZED AREA



TRANSIT INDUSTRY COST EFFECTIVENESS
 OPERATING EXPENSE PER UNLINKED PASSENGER TRIP AND PASSENGER MILE
 BY URBANIZED AREA SIZE
 SECTION 15 1987

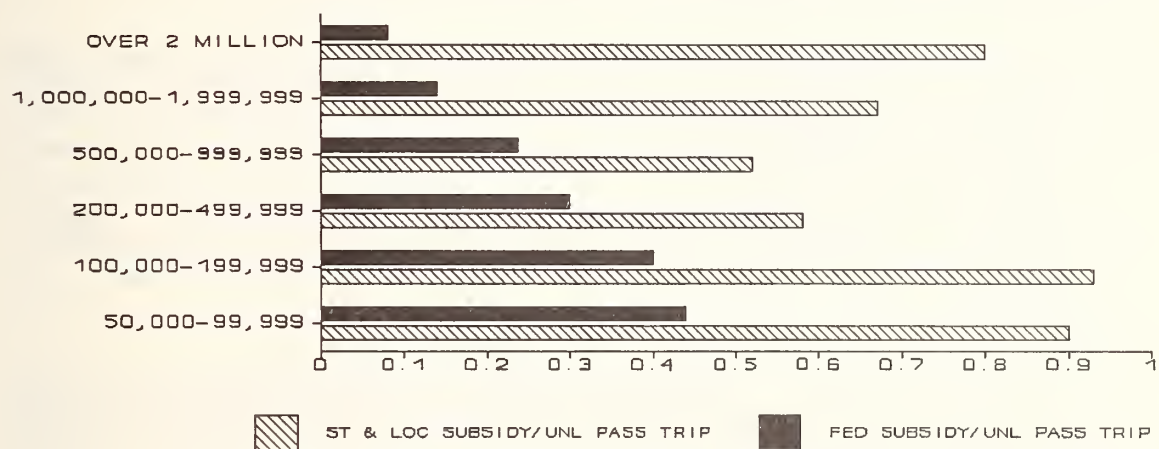
Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION
OPER EXPENSES/PASS TRIP	1.62	1.70	1.46	1.27	1.38	1.47
OPER EXPENSES/PASS MILE	0.47	0.46	0.72	0.40	0.43	0.43

(Dollars)

- o Federal subsidy per passenger trip, which amounted to \$0.12 in 1987 and which was a 2 percent increase over 1986, tended to decrease as urbanized area population increased:
 - Transit systems in urbanized areas with 2 million or more residents received \$0.08 per passenger trip.
 - Transit systems in urbanized areas with between 1 and 2 million residents received \$0.14 per passenger trip.
 - Transit systems in urbanized areas with between 200,000 and 1 million residents received \$0.27 per passenger trip.
 - Transit systems in urbanized areas with less than 200,000 residents received \$0.41 per passenger trip.
- o State and local subsidies per passenger trip overall was \$0.77 or six times the federal subsidy per passenger trip. In the smallest urbanized areas (with less than 200,000 residents) state subsidies per passenger trip were about twice the federal subsidies. In the largest urbanized areas (with more than 2 million residents) state and local subsidies per passenger trip were over 10 times federal subsidies.
- o State and local assistance had the largest increases in 1987 over 1986 in the urbanized areas with 100,000 to 199,999 residents and 200,000 to 499,999 residents with increases of 28 percent and 22 percent respectively.

TRANSIT INDUSTRY COST EFFECTIVENESS
 FEDERAL, STATE AND LOCAL SUBSIDY PER UNLINKED PASSENGER TRIP
 BY URBANIZED AREA SIZE
 SECTION 15 1987

URBANIZED AREA



TRANSIT INDUSTRY COST EFFECTIVENESS
 FEDERAL, STATE AND LOCAL SUBSIDY
 PER UNLINKED PASSENGER TRIP
 BY URBANIZED AREA SIZE
 BY SECTION 1987

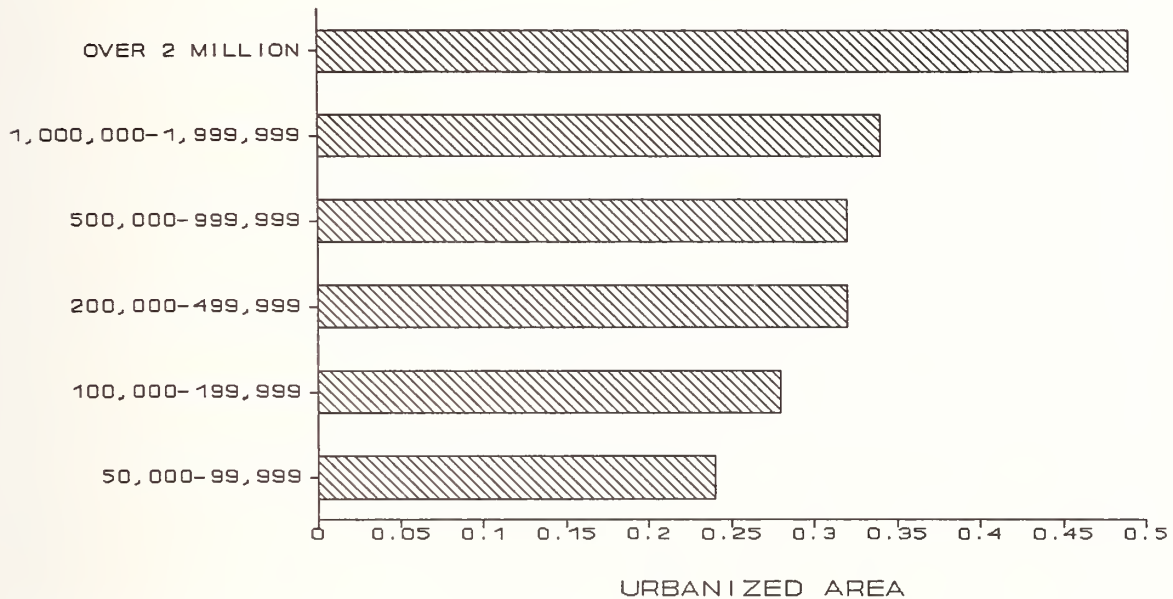
Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION	TOTAL
ST & LOC SUBSIDY/UNL PASS TRIP	0.90	0.93	0.58	0.52	0.67	0.80	0.77
FED SUBSIDY/UNL PASS TRIP	0.44	0.40	0.30	0.24	0.14	0.08	0.12

(Dollars)

- o The indicator of cost effectiveness shown on the facing page measures the proportion of transit system operating expense financed through passenger fares. This indicator is one of the most important measures of transit system performance. It has long been used by transit managers as well as by local, state, and federal transit administrators to evaluate the cost effectiveness of transit systems. Some states, such as California, even specify performance levels for this indicator in their eligibility requirements for operating funds.
- o The facing table shows that in 1987 the largest urbanized areas financed the highest proportion of their operating expenses through passenger fares (49 percent). Urbanized areas with between 200,000 and 2 million residents financed about one-third of their operating costs through passenger fares. Urbanized areas with less than 200,000 residents financed between 24 and 28 percent of their operating costs with passenger fares.
- o With the exception of the urbanized areas with between 500,000 to 999,999 residents which experienced a 6 percent decrease, all other urbanized areas had increases in operating expenses financed through passenger fares, generally in the 9 percent range, except for the urbanized areas with over 2,000,000 residents which had an increase of 24 percent in 1987 over 1986.

TRANSIT INDUSTRY COST EFFECTIVENESS
 FAREBOX REVENUE PER OPERATING EXPENSE
 BY URBANIZED AREA SIZE
 SECTION 15 1987

FAREBOX REVENUE/OPER EXPENSES



TRANSIT INDUSTRY COST EFFECTIVENESS
 FAREBOX REVENUE PER OPERATING EXPENSE
 BY URBANIZED AREA SIZE
 SECTION 15 1987

Population -->	50,000 TO 99,999	100,000 TO 199,999	200,000 TO 499,999	500,000 TO 999,999	1 MILLION TO 1,999,999	OVER 2 MILLION
FAREBOX REVENUE/OPER EXPENSES	0.24	0.28	0.32	0.32	0.34	0.49

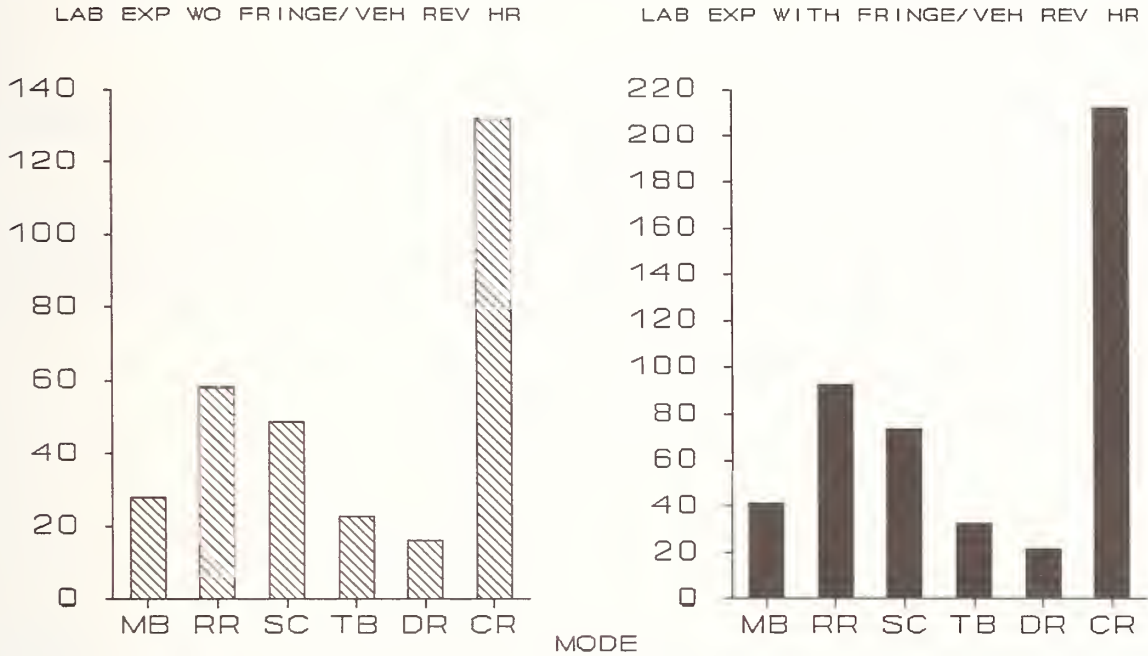


B. ISSUE ORIENTED MEASURES

- * *LABOR EFFICIENCY & UTILIZATION*
- * *MATERIALS & UTILITIES EFFICIENCY*
- * *FUNCTIONAL EFFICIENCY*
- * *FLEET CONTROL*
- * *SAFETY*

- o Labor expense per vehicle revenue hour is a measure of transit system cost efficiency. The indicators include labor expenses with and without fringe benefit costs. Vehicle revenue hours are included in the indicators, since labor expenses are incurred largely based on the hours of service provided.
- o The labor expenses per hour of service were much higher for rail than non-rail modes of transit service.
- o Fringe benefits expense added between 25 and 38 percent to the labor cost per revenue hour of service. More specifically, fringe benefit cost per revenue hour represented:
 - \$13.30 for motor bus (32.3 percent of labor and fringe benefit expense per revenue hour).
 - \$34.33 for rapid rail (37.1 percent of labor and fringe benefit expense per revenue hour).
 - \$24.70 for streetcar (33.5 percent of labor and fringe benefit expense per revenue hour of service).
 - \$9.83 for trolley bus (30.1 percent of labor and fringe benefit expense per revenue hour).
 - \$79.87 for commuter rail (37.7 percent of labor and fringe benefit expense per revenue hour).
 - \$5.40 for demand response (25.1 percent of labor and fringe benefit expense per revenue hour).
- o Only trolley bus had a decrease in cost of labor and fringe benefit expense per revenue hour of 7 percent while the other modes had increases of 1 to 10 percent in 1987 over 1986.

TRANSIT INDUSTRY LABOR EFFICIENCY
 LABOR EXPENSE (WITH AND WITHOUT FRINGES) PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1987



TRANSIT INDUSTRY LABOR EFFICIENCY
 LABOR EXPENSE (WITH AND WITHOUT FRINGES)
 PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1987

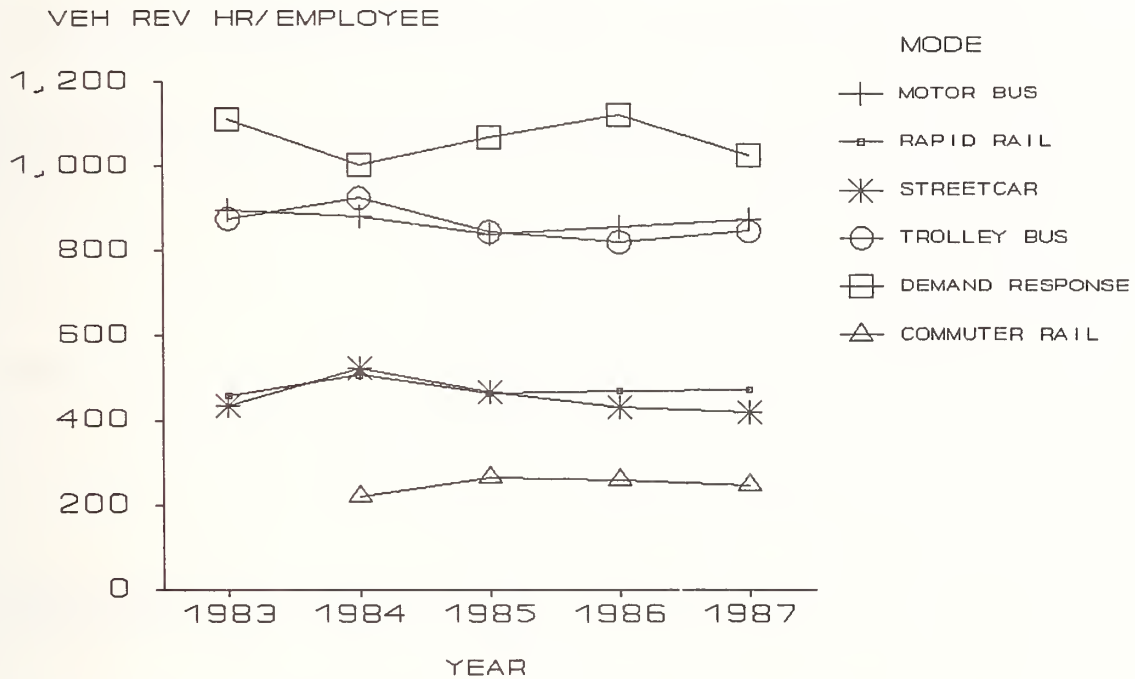
	LABOR EXP WITHOUT FRINGE/ VEH REV HOUR	LABOR EXP WITH FRINGE/ VEH REV HOUR
MOTOR BUS	27.8	41.1
RAPID RAIL	58.1	92.4
STREET CAR	49.0	73.7
TROLLEY BUS	22.9	32.7
DEMAND RESPONSE	16.1	21.5
COMMUTER RAIL	132.1	212.0

(Dollars)

- o Vehicle revenue hours per equivalent employee for most modes either leveled off or decreased between 1983 and 1987.
- o The number of vehicle revenue hours per equivalent employee increased only for rapid rail from 1983 to 1987 at an average annual rate of 0.8 percent. The other modes declining rates were as follows:*
 - Motor bus - -0.6 percent.
 - Street car - -0.7 percent.
 - Trolley bus - -0.8 percent.
 - Demand response - -1.6 percent.
- o However, between 1986 and 1987 the motor bus, rapid rail and trolley bus systems experienced increases in the number of vehicle revenue hours per equivalent employee of 2.0, 1.0, 3.0 percent respectively.
- o Between 1986 and 1987 streetcar, trolley bus and commuter rail systems experienced declines in the number of vehicle revenue hours per equivalent employee of 2.3, 8.6, and 4.4, respectively.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY LABOR EFFICIENCY TRENDS
 VEHICLE REVENUE HOURS PER TOTAL EQUIVALENT EMPLOYEE
 BY MODE
 SECTION 15 1983-1987



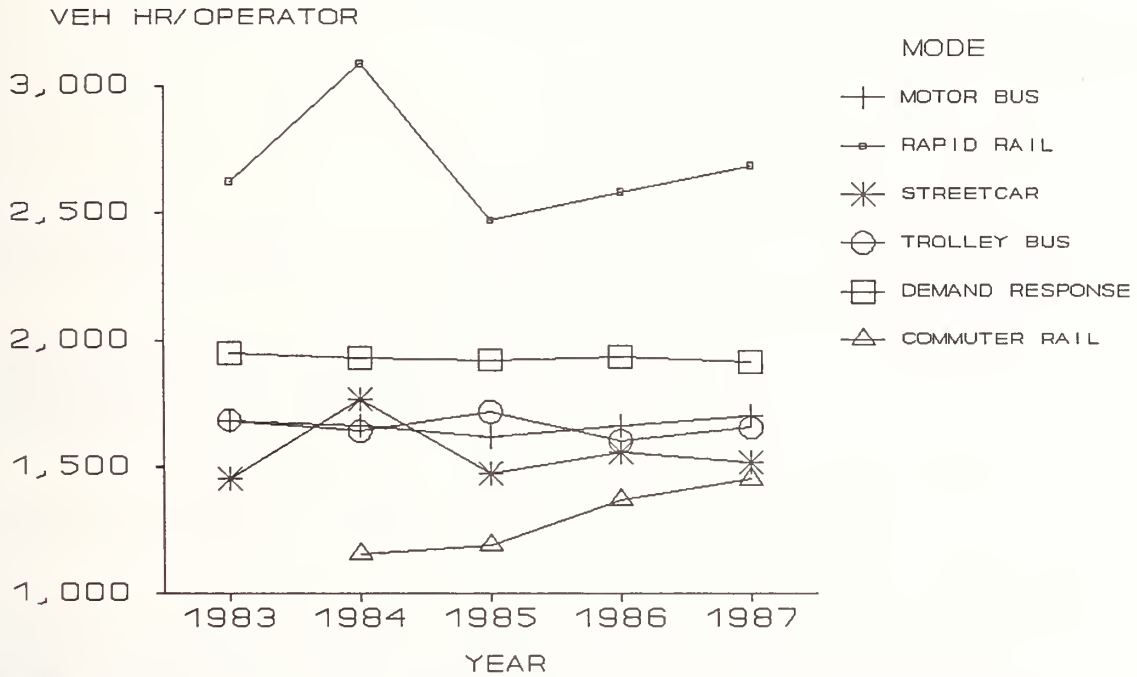
TRANSIT INDUSTRY LABOR EFFICIENCY TRENDS
 VEHICLE REVENUE HOURS PER TOTAL EQUIVALENT EMPLOYEE
 BY MODE
 SECTION 15 1983-87

	1983	1984	1985	1986	1987
MOTOR BUS	895.1	882.2	838.6	858.4	875.4
RAPID RAIL	458.5	508.2	464.4	469.5	472.9
STREET CAR	433.3	525.0	467.5	430.3	420.8
TROLLEY BUS	876.4	925.1	845.1	821.5	847.5
DEMAND RESPONSE	1,110.8	1,004.3	1,069.6	1,123.2	1,026.5
COMMUTER RAIL	N/A	219.7	265.0	258.9	247.5

- o The indicator on the facing page measures the amount of time per year, on average, that vehicle operators operate transit vehicles.
- o Between 1983 and 1987, each mode experienced some fluctuations in the annual number of vehicle hours per operator. The five modes for which data were available for 1983 through 1987 reported average annual increases of:
 - Motor bus - 0.4 percent
 - Rapid rail - 0.7 percent.
 - Streetcar - 1.1 percent.
 - Trolley bus - (0.4) percent.
 - Demand Response - (0.4) percent.
- o The five modes can be ranked for the average number of vehicle hours per operator between 1983 and 1987 as follows (from highest to lowest)*:
 - Rapid rail - 2,690 hours per operator.
 - Demand Response - 1,930 hours per operator.
 - Motor bus - 1,665 hours per operator.
 - Trolley Bus - 1,660 hours per operator.
 - Streetcar - 1,554 hours per operator.
- o Based on the data reported, rapid rail vehicle operators had 73.1 percent higher average annual vehicle hours than streetcar operators.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY LABOR EFFICIENCY TRENDS
 VEHICLE HOURS PER EQUIVALENT OPERATOR
 BY MODE
 SECTION 15 1983-1987

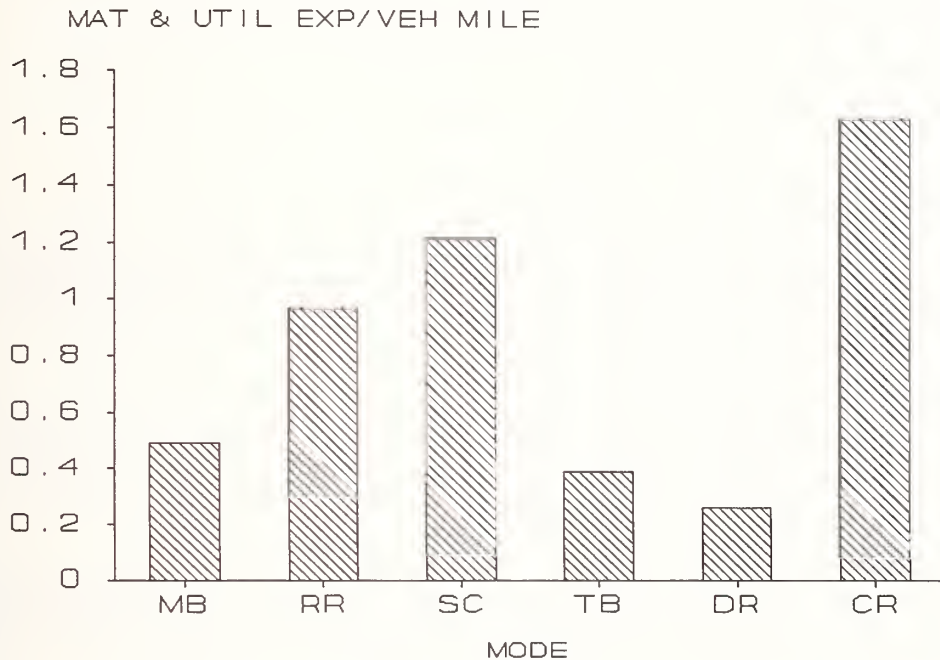


TRANSIT INDUSTRY LABOR EFFICIENCY TRENDS
 VEHICLE HOURS PER EQUIVALENT OPERATOR
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	1,679.2	1,663.4	1,616.2	1,660.5	1,703.3
RAPID RAIL	2,622.8	3,086.2	2,470.4	2,583.0	2,687.8
STREET CAR	1,453.8	1,764.3	1,473.7	1,559.6	1,518.9
TROLLEY BUS	1,683.9	1,639.9	1,717.2	1,602.2	1,654.5
DEMAND RESPONSE	1,950.5	1,928.9	1,922.5	1,933.4	1,916.3
COMMUTER RAIL	N/A	1,154.9	1,190.3	1,368.7	1,452.5

- o Materials and utilities included fuel and lubricants, tires and tubes, and other materials and supplies.
- o Materials and utilities expense per vehicle mile measures the dollar expenditure for selected items needed to maintain and operate transit services in relation to service outputs (i.e., the amount of service provided).
- o Materials and utilities expenses were between \$0.26 and \$1.63 per vehicle mile of service.
- o Rail modes (i.e. rapid rail, streetcar, and commuter rail) incurred higher materials and utilities expense per mile (between \$0.97 and \$1.63) while non-rail modes (i.e. motor bus, trolley bus and demand response) incurred lower materials and utilities expense per mile (between \$0.26 and \$0.49.)
- o Except for streetcar and commuter rail which had a 5 percent and 2 percent cost increase in material and utilities per vehicle mile, every mode reduced costs between 5 to 11 percent or stayed the same (rapid rail) in 1987 over 1986.

TRANSIT INDUSTRY COST EFFICIENCY
 MATERIALS AND UTILITIES EXPENSE PER VEHICLE MILE
 BY MODE
 SECTION 15 1987



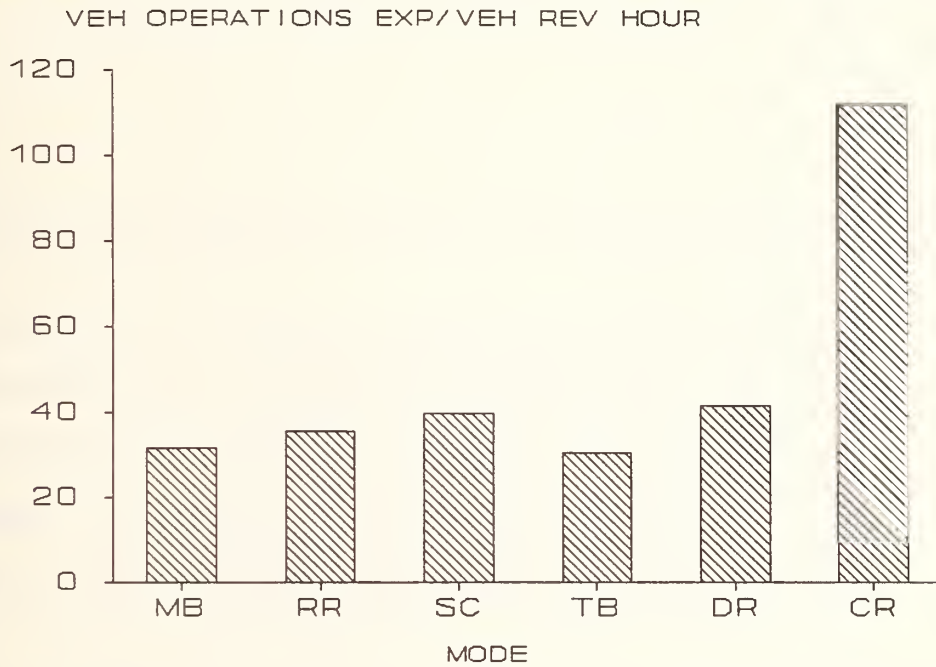
TRANSIT INDUSTRY COST EFFICIENCY
 MATERIALS AND UTILITIES EXPENSE PER VEHICLE MILE
 BY MODE
 SECTION 15 1987

	MAT & U EXP/ VEH MILE
MOTOR BUS	0.49
RAPID RAIL	0.97
STREET CAR	1.21
TROLLEY BUS	0.39
DEMAND RESPONSE	0.26
COMMUTER RAIL	1.63

(Dollars)

- o The performance cost indicator shown on the facing page measures transit system efficiency for vehicle operations expenditures in relation to vehicle revenue hours of service which excludes deadhead travel time.
- o The vehicle operations function represents the greatest proportion of operating expenses for most modes (except rapid rail) because it is a labor intensive function, including all vehicle operators and operations supervisory personnel.
- o Commuter rail had the highest vehicle operations expense per vehicle revenue hour (\$112.09). The second highest mode was demand response (\$41.49). This was a 42 percent increase for commuter rail over 1986 and a 20 percent increase for demand response.
- o Motor bus, rapid rail, trolley bus, and streetcar each reported vehicle operations expense per vehicle revenue hour of between \$30 and \$40. Motor bus and rapid rail had increases in expenses per vehicle revenue hour of 1 percent and 9 percent respectively. Streetcar and trolley bus had decreases of 3 percent and 5 percent respectively in 1987 over 1986.

TRANSIT INDUSTRY VEHICLE OPERATIONS EFFICIENCY
 VEHICLE OPERATIONS EXPENSE PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1987



TRANSIT INDUSTRY VEHICLE OPERATIONS EFFICIENCY
 VEHICLE OPERATIONS EXPENSE PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 - 1987

	OP EXP/ VEH REV HOUR
MOTOR BUS	31.72
RAPID RAIL	35.55
STREET CAR	39.82
TROLLEY BUS	30.66
DEMAND RESPONSE	41.49
COMMUTER RAIL	112.09

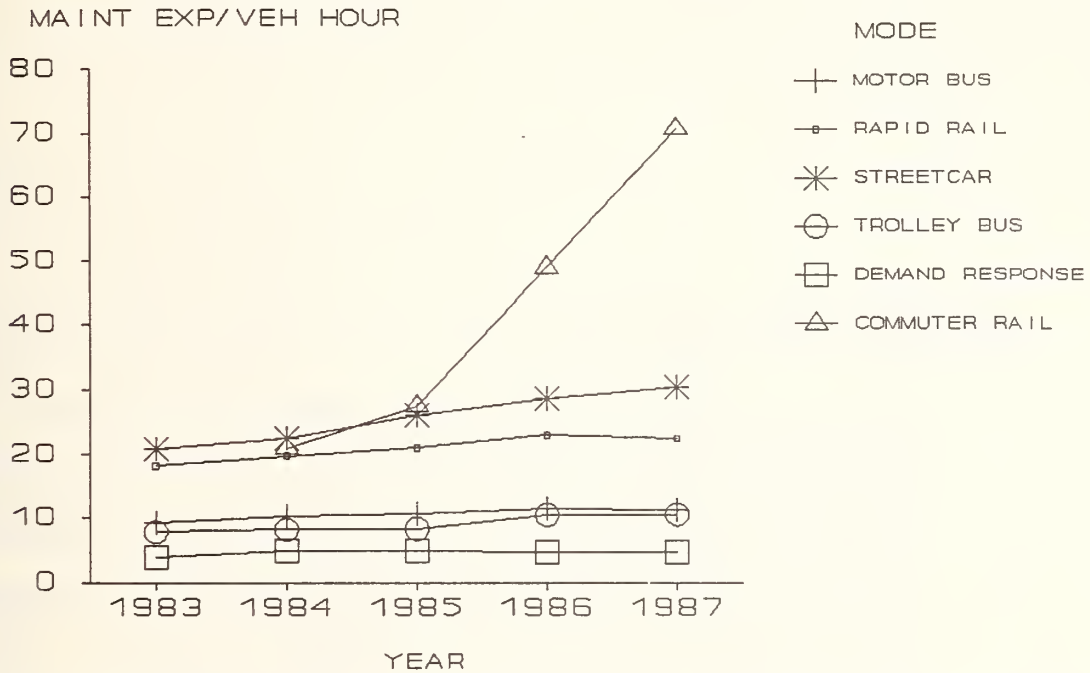
(Dollars)

- o From 1983 to 1987, maintenance expenses per vehicle hour increased annually for all modes*.
 - Motor bus maintenance expenses per vehicle hour increased at an average annual rate of 5.0 percent.
 - Rapid rail maintenance expenses per vehicle hour increased at an average annual rate of 6.0 percent.
 - Streetcar maintenance expenses per vehicle hour increased at an average annual rate of 8.3 percent.
 - Trolley bus maintenance expenses per vehicle hour increased at an average annual rate of 7.7 percent.
 - Demand response maintenance expense per vehicle hour increased at an average annual rate of 4.8 percent.

- o The rail vehicles, which are more complex and generally older (except for trolley bus) than motor bus and demand response vehicles, had significantly higher maintenance expense per vehicle hour.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MAINTENANCE EXPENSE PER VEHICLE HOUR
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MAINTENANCE EXPENSE PER VEHICLE HOUR
 BY MODE
 SECTION 15 1983-1987

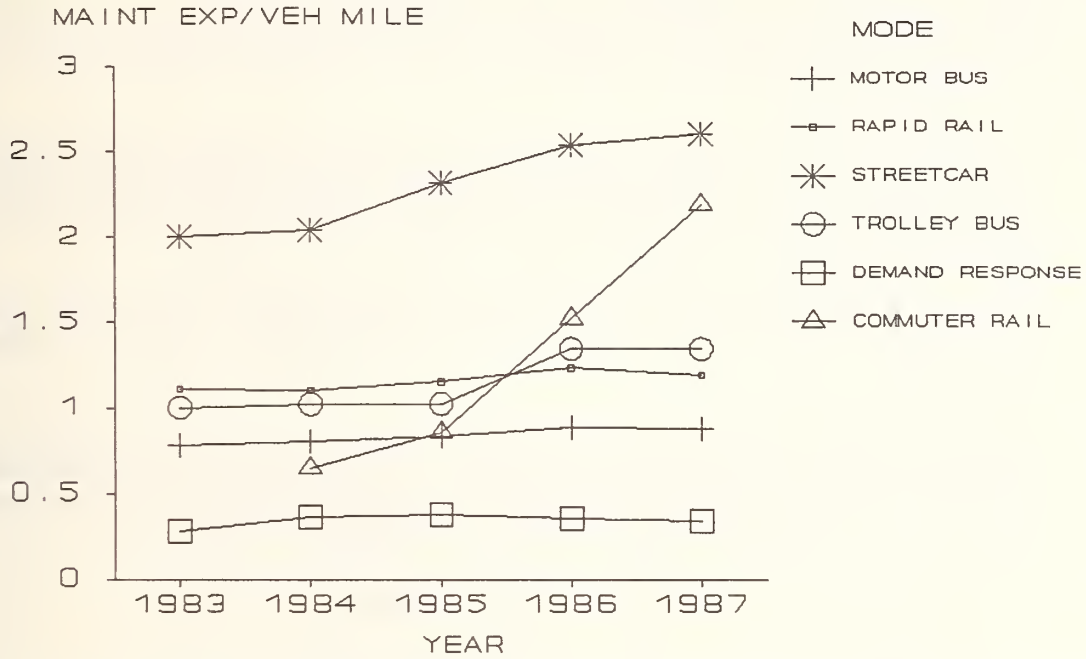
	1983	1984	1985	1986	1987
MOTOR BUS	9.38	10.20	10.62	11.40	11.32
RAPID RAIL	18.17	19.69	20.95	22.92	22.43
STREETCAR	20.79	22.37	26.01	28.53	30.31
TROLLEY BUS	7.81	8.21	8.30	10.48	10.56
DEMAND RESPONSE	3.91	4.83	4.83	4.71	4.72
COMMUTER RAIL	N/A	20.82	27.43	48.97	70.75

(Dollars)

- o From 1983 to 1987, maintenance expenses per vehicle mile increased annually for all modes*.
 - Motor bus maintenance expenses per vehicle mile increased at an average annual rate of 3.2 percent.
 - Rapid rail maintenance expenses per vehicle mile increased at an average annual rate of 1.7 percent.
 - Streetcar maintenance expenses per vehicle mile increased at an average annual rate of 6.9 percent.
 - Trolley bus maintenance expenses per vehicle mile increased at an average annual rate of 7.7 percent.
 - Demand response maintenance expenses per vehicle mile increased at an average annual rate of 4.4 percent.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MAINTENANCE EXPENSE PER VEHICLE MILE
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MAINTENANCE EXPENSE PER VEHICLE MILE
 BY MODE
 SECTION 15 1983-1987

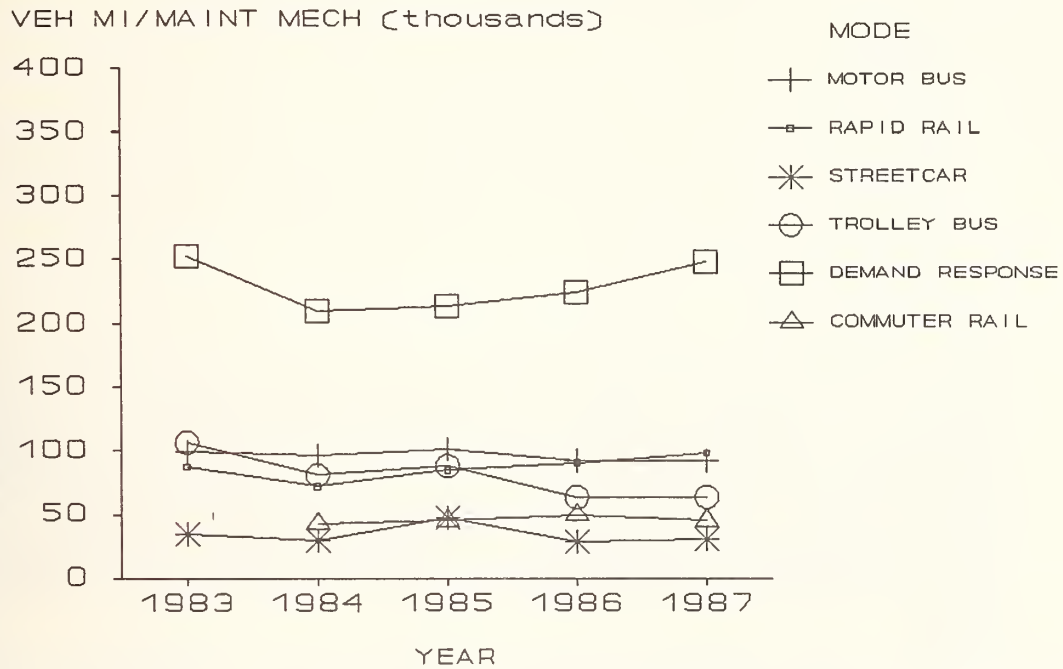
	1983	1984	1985	1986	1987
MOTOR BUS	0.78	0.80	0.83	0.89	0.88
RAPID RAIL	1.11	1.10	1.15	1.23	1.19
STREETCAR	2.00	2.04	2.32	2.54	2.61
TROLLEY BUS	1.00	1.02	1.02	1.34	1.34
DEMAND RESPONSE	0.28	0.36	0.38	0.36	0.34
COMMUTER RAIL	N/A	0.65	0.86	1.53	2.19

(Dollars)

- o Vehicle miles per revenue vehicle maintenance mechanic is a ratio to evaluate maintenance efficiency. However, this ratio does not capture the maintenance mechanic if the system contracts out for its maintenance.
- o The graph on the facing page demonstrates the substantially lower number of vehicle miles per revenue vehicle maintenance mechanic for the streetcar mode compared to the other three urban fixed route modes (motor bus, trolley bus and rapid rail) in 1987.
- o Demand response service had more than twice the vehicle miles per maintenance mechanic than rapid rail and nearly 8 times more than streetcar.
- o Between 1983 and 1987 every mode fluctuated in its vehicle miles per revenue vehicle maintenance mechanic. In 1987, two of the modes had realized average annual increases in this measure, meaning they provided more service per mechanic. These modes were:
 - Rapid rail - + 3.1 percent.
 - Commuter rail - + 2.1 percent.*
- o The other modes reported an average annual decrease in this measure, or a decline in the amount of service per mechanic.
 - Motor bus - - 1.7 percent.
 - Street car - - 3.0 percent.
 - Trolley bus - -12.0 percent.
 - Demand response - - 0.5 percent.

NOTE: *This is a change only between 1984 and 1987; data were not reported prior to 1984.

TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MILES PER REVENUE VEHICLE MAINTENANCE MECHANIC
 BY MODE
 SECTION 15 1983-1987

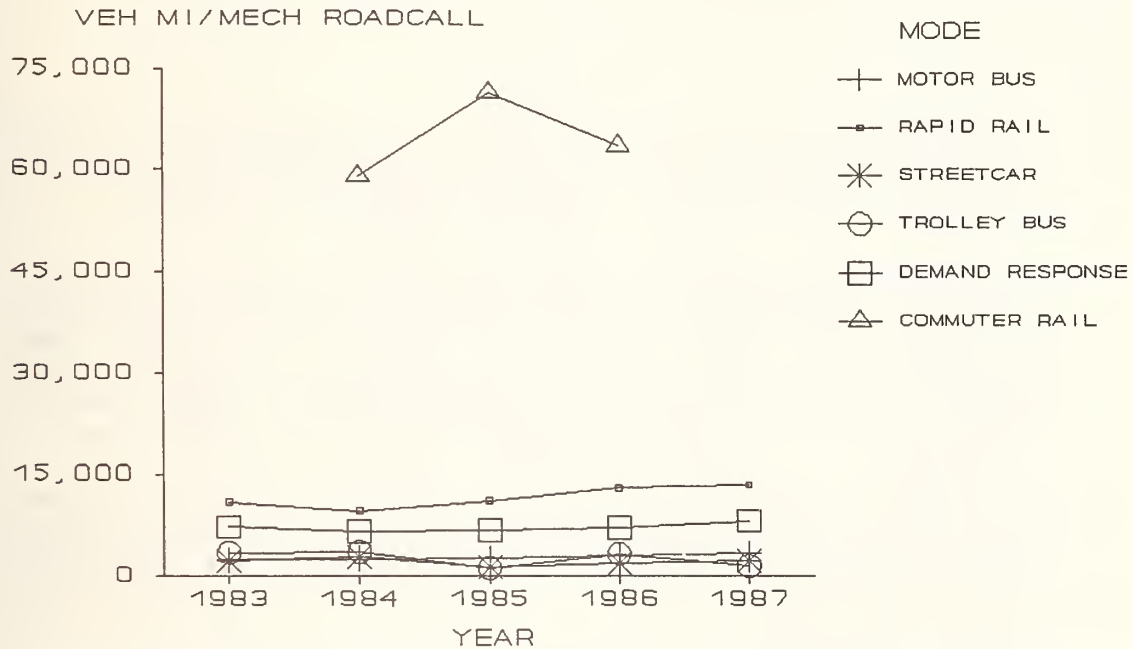


TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MILES PER REVENUE VEHICLE MAINTENANCE MECHANIC
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	99,427.0	96,220.6	101,652.6	92,289.2	92,669.2
RAPID RAIL	87,183.0	72,057.2	84,999.7	90,529.0	98,452.2
STREET CAR	34,721.0	30,110.3	47,520.6	28,930.0	30,666.4
TROLLEY BUS	106,390.0	80,877.0	88,044.6	63,646.0	63,841.4
DEMAND RESPONSE	252,726.3	209,101.2	213,503.0	224,005.9	247,870.0
COMMUTER RAIL	N/A	42,619.7	45,447.2	49,709.6	45,417.4

- o Vehicle miles per mechanical roadcall is a ratio used in the transit industry to monitor vehicle maintenance performance. Although Section 15 provides a definition for roadcalls, many transit systems continue to count roadcalls using definitions different from those specified by UMTA. Therefore, comparisons between systems and between modes are not reliable indicators of the frequency of vehicle breakdowns. Comparisons over time for any system, shown in Section 3 of the Annual Report, would indicate trends for that system.
- o Commuter rail in 1987 was the only mode that reported no mechanical roadcalls.

TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MILES PER MECHANICAL ROADCALL
 BY MODE
 SECTION 15 1983-1987



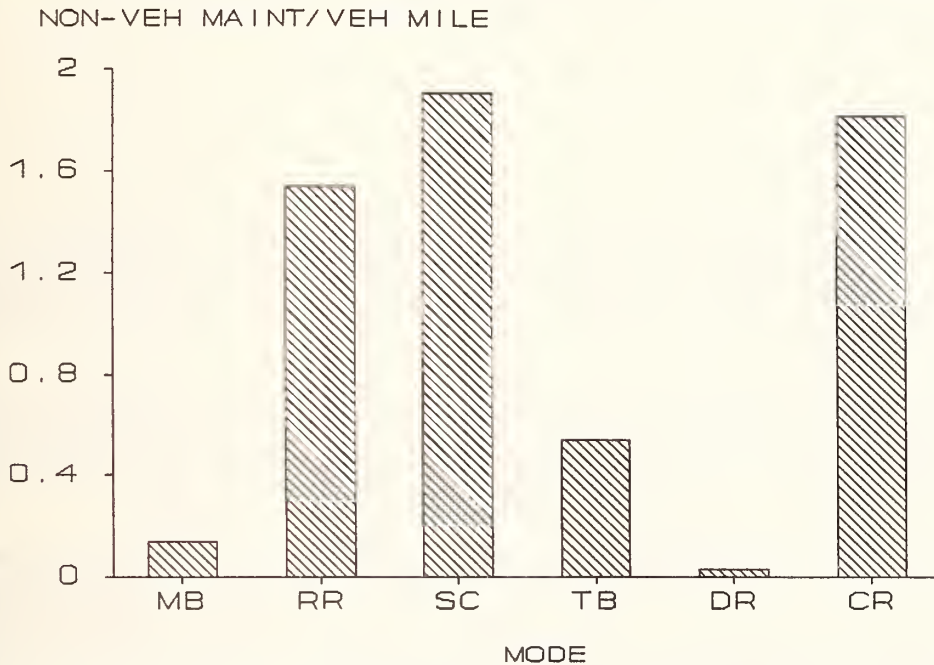
TRANSIT INDUSTRY VEHICLE MAINTENANCE EFFICIENCY TRENDS
 VEHICLE MILES PER MECHANICAL ROADCALL
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	2,519.8	2,533.8	2,638.4	3,048.8	3,479.9
RAPID RAIL	10,893.8	9,580.6	11,095.0	13,007.5	13,401.4
STREET CAR	2,326.8	2,820.1	1,280.2	1,914.7	2,335.7
TROLLEY BUS	3,466.9	3,531.6	1,171.7	3,280.6	1,490.9
DEMAND RESPONSE	7,202.9	6,602.6	6,816.1	7,133.9	8,130.4
COMMUTER RAIL	N/A	58,925.3	71,492.5	63,535.9	*

* NOTE: Table 2's show zero Roadcalls.

- o The performance indicator shown on the facing page measures transit system cost efficiency for non-vehicle maintenance expenditures in relation to vehicle miles, including deadhead travel time.
- o The non-vehicle maintenance function represented a very small commitment and therefore the lowest proportion of operating expenses for the non-rail modes (i.e. motor bus, trolley bus, and demand response). Since rail modes must maintain rail rights-of-way, complex electrical systems, and often stations, their financial commitment to non-vehicle maintenance is far more significant.
- o Streetcar and commuter rail modes had the first and second highest non-vehicle maintenance expense per vehicle mile, with \$1.91 and \$1.82 respectively. These increases represent a 6.9 percent increase for streetcar and 39.4 percent increase for commuter rail in 1987 over 1986.
- o Rapid rail and trolley bus ranked third and fourth for their non-vehicle maintenance expense per vehicle mile, with \$1.54 and \$0.54 respectively. These increases represent a 2.9 percent increase for rapid rail and a 7 percent increase for trolley bus in 1987 over 1986.
- o The motor bus and demand response modes had the lowest non-vehicle maintenance expense per vehicle mile with \$0.14 and \$0.03 respectively. This represents a 5.4 percent increase for motor bus and a 30 percent decrease for demand response in 1987 over 1986.

TRANSIT INDUSTRY NON-VEHICLE MAINTENANCE EFFICIENCY
NON-VEHICLE MAINTENANCE EXPENSE PER VEHICLE MILE
BY MODE
SECTION 15 1987



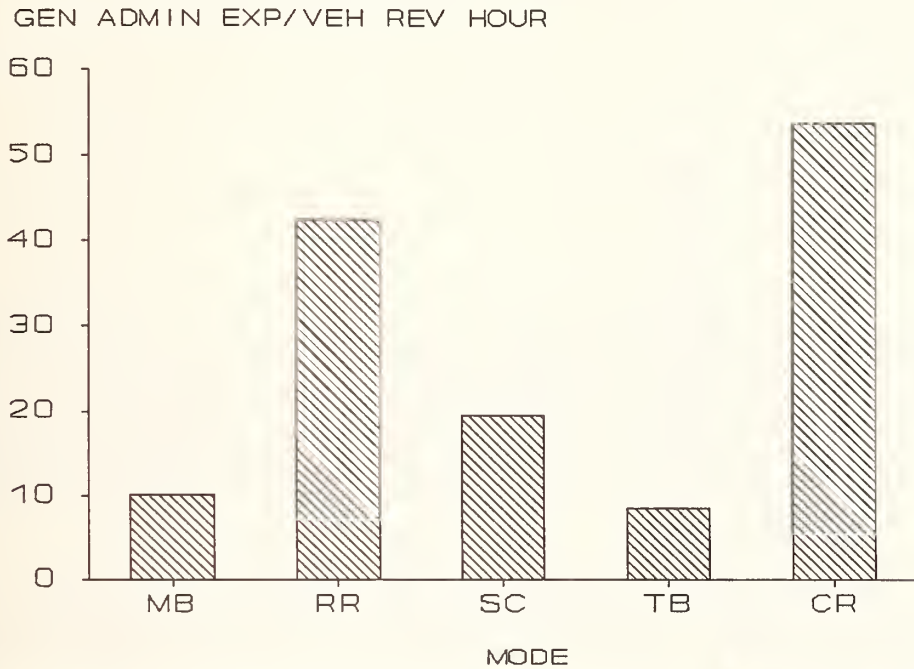
TRANSIT INDUSTRY NON-VEHICLE MAINTENANCE EFFICIENCY
NON-VEHICAL MAINTENANCE EXPENSE PER VEHICLE MILE
BY MODE
SECTION 15 1987

NON VEH MAINT EX/ VEH MILE	
MOTOR BUS	0.14
RAPID RAIL	1.54
STREET CAR	1.91
TROLLEY BUS	0.54
DEMAND RESPONSE	0.03
COMMUTER RAIL	1.82

(Dollars)

- o The performance indicator shown on the facing page measures transit system cost efficiency for general administrative expenditures in relation to vehicle revenue hours of service, excluding deadhead travel time.
- o The general administrative function includes responsibilities that support transit operations. With the exception of rapid rail and commuter rail, this function generally does not represent one of the higher proportions of operating expenses.
- o Rapid rail, which reported that its general administration expenses represented 31.9 percent (the highest among all modes) of its operating costs has the second highest general administration expenses per vehicle revenue hour at \$42.48 behind commuter rail which spent \$53.78 per vehicle revenue hour.
- o The enormous decrease for general administration for commuter rail in 1987 over 1986 should be noted. In 1986 general administration accounted for 37.9 percent of its expenses while in 1987 it declined to 16.7 percent. Rapid rail and commuter rail spend more than double on general administration than the other modes.

TRANSIT INDUSTRY GENERAL ADMINISTRATION EFFICIENCY
 GENERAL ADMINISTRATION EXPENSE PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 1987



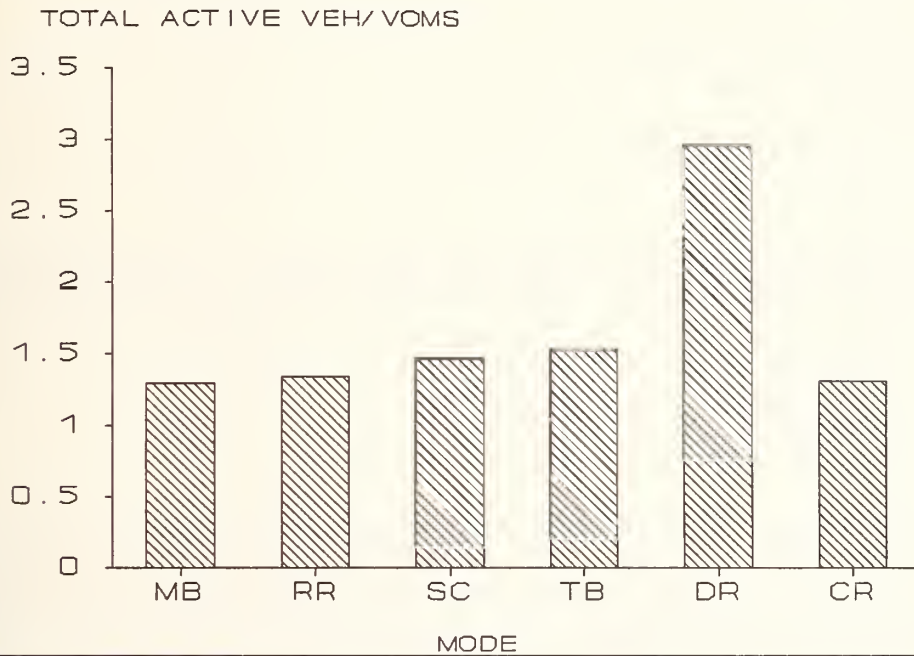
TRANSIT INDUSTRY GENERAL ADMINISTRATION EFFICIENCY
 GENERAL ADMINISTRATION EXPENSE PER VEHICLE REVENUE HOUR
 BY MODE
 SECTION 15 - 1987

GEN ADM EXP/ VEH REV HR	
MOTOR BUS	10.07
RAPID RAIL	42.48
STREET CAR	19.46
TROLLEY BUS	8.48
COMMUTER RAIL	53.78

(Dollars)

- o The ratio of the total active fleet vehicles and the vehicles in maximum scheduled service measures the relative size of a transit system's spare fleet. Three of the modes (motor bus, rapid rail, and commuter rail) reported a spare fleet of about 30 to 34 percent. Streetcar reported a spare fleet of 47 percent, trolley bus had a 53 percent spare fleet, and demand response reported a spare fleet of about 197 percent.
- o With the exception of demand response and motor bus systems, there was an increase in the size of the spare fleet in range of 2 to 7 percent in 1987 over 1986, except for trolley bus which increased by 27.5 percent.
- o Demand response and motor bus spare fleet decreased by 8 percent and 2 percent respectively in 1987 over 1986.

TRANSIT INDUSTRY VEHICLE SPARE RATIO
 TOTAL ACTIVE VEHICLES TO VEHICLES IN MAXIMUM SERVICE
 BY MODE
 SECTION 15 1987



TRANSIT INDUSTRY VEHICLE SPARE RATIO
 TOTAL ACTIVE VEHICLES TO VEHICLES IN MAXIMUM SERVICE
 BY MODE
 SECTION 15 1987

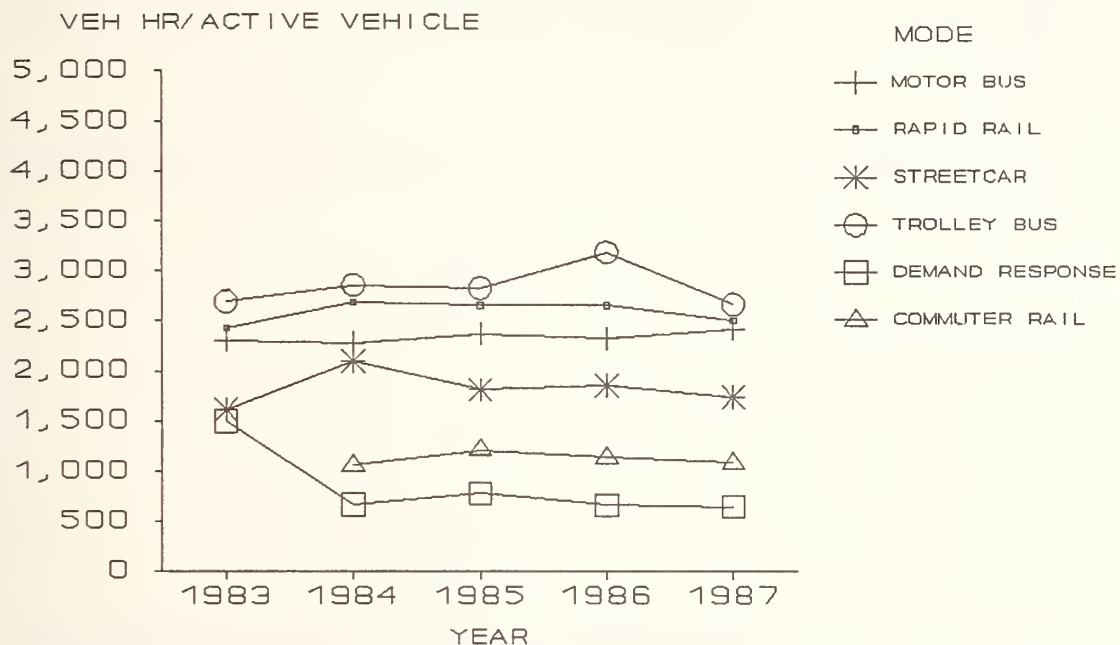
	ACTIVE VEH/ VOMS
MOTOR BUS	1.30
RAPID RAIL	1.34
STREETCAR	1.47
TROLLEY BUS	1.53
DEMAND RESPONSE	2.97
COMMUTER RAIL	1.32

- o The fixed route modes exhibited average annual increases in vehicle hours per active vehicle from 1983 to 1987, except for trolley bus*.
 - Motor bus - 1.2 percent.
 - Rapid Rail - 0.8 percent.
 - Streetcar - 1.9 percent.
 - Trolley Bus - -0.2 percent.

- o The two factors that influence increases and decreases in vehicle hours per active vehicle are changes in service and expansion or reduction in the fleet size. Demand response fleets, for example, have expanded considerably as services have been introduced between 1983 and 1987, but demand response systems have had a 19 percent average annual decrease in vehicle hours per active vehicles between 1983 and 1987.

*Commuter rail is not included because data are only for 1984 to 1987.

TRANSIT INDUSTRY VEHICLE UTILIZATION TRENDS
 VEHICLE HOURS PER ACTIVE VEHICLE
 BY MODE
 SECTION 15 1983-1987



TRANSIT INDUSTRY VEHICLE UTILIZATION TRENDS
 VEHICLE HOURS PER ACTIVE VEHICLE
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	2,304.6	2,273.2	2,369.0	2,322.4	2,418.9
RAPID RAIL	2,430.3	2,680.5	2,652.5	2,651.7	2,506.2
STREET CAR	1,612.3	2,097.9	1,811.0	1,850.9	1,740.0
TROLLEY BUS	2,693.0	2,854.9	2,823.9	3,184.5	2,667.5
DEMAND RESPONSE	1,498.4	663.4	776.6	661.7	645.8
COMMUTER RAIL	N/A	1059.1	1,203.4	1,134.3	1,083.2

o Rapid Rail recorded the highest vehicle miles per active vehicle with 47,365, even though there was a decrease from 1986 to 1987. Commuter rail remained second highest with annual vehicle miles per active vehicle of 34,959.

o Dividing vehicle miles by vehicle hours provides a measure of average speed. The average speeds of each mode are ranked below from fastest to slowest:

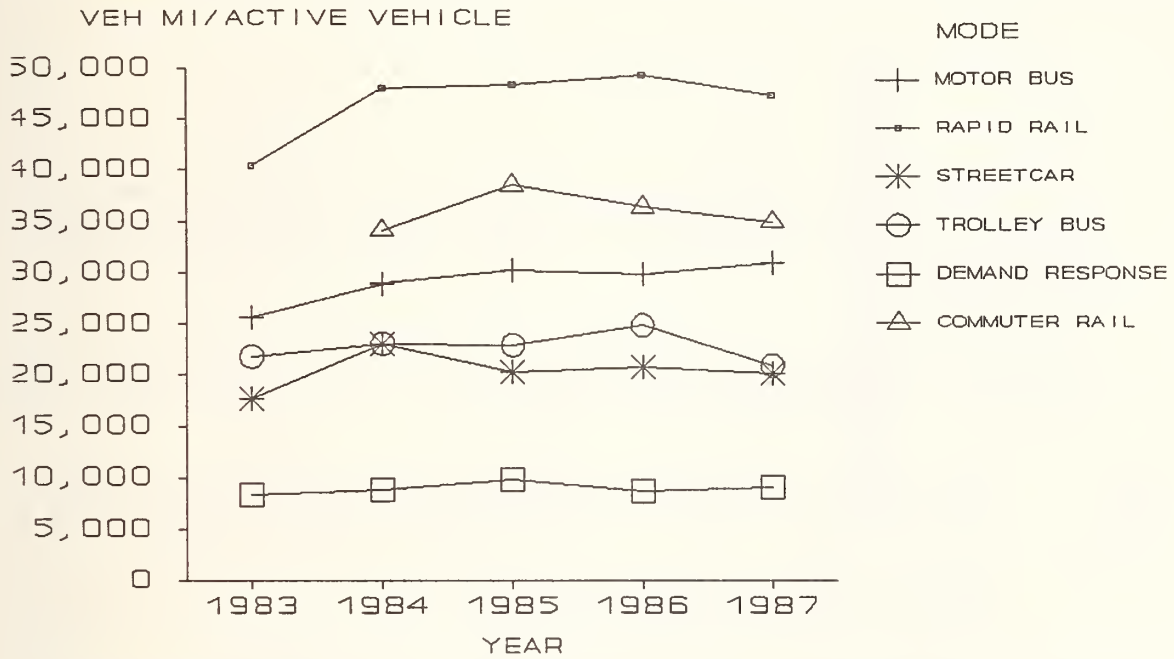
- Commuter rail - 32.3 miles per hour.
- Rapid rail - 18.9 miles per hour.
- Demand response - 14.0 miles per hour.
- Motor bus - 12.8 miles per hour.
- Streetcar - 11.6 miles per hour.
- Trolley bus - 7.9 miles per hour.

o Average speed is influenced by a number of factors, including the type of service provided (express, local), traffic congestion, and vehicle right-of-way (mixed vs. exclusive).

o All modes exhibit average annual increases in vehicle miles per active vehicle from 1983 to 1987, except for trolley bus: *

- Motor bus - 4.8 percent.
- Rapid rail - 4.0 percent.
- Streetcar - 3.4 percent.
- Demand response - 1.9 percent.
- Trolley bus - -1.0 percent.

TRANSIT INDUSTRY VEHICLE UTILIZATION TRENDS
 VEHICLE MILES PER ACTIVE VEHICLE
 BY MODE
 SECTION 15 1983-1987

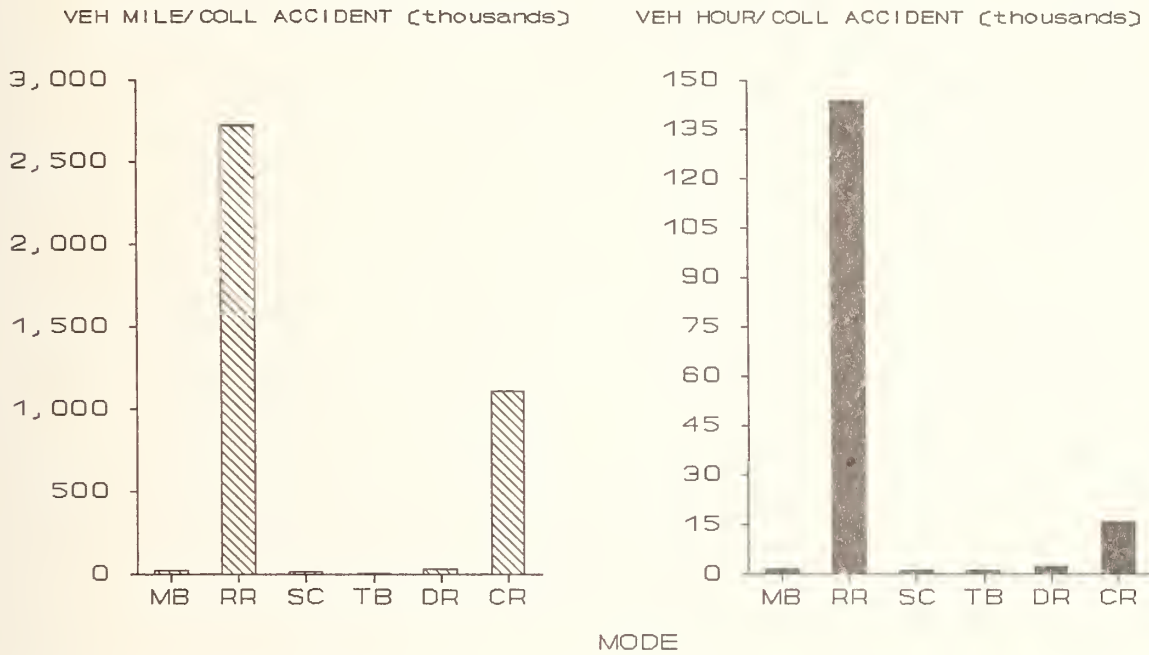


TRANSIT INDUSTRY VEHICLE UTILIZATION TRENDS
 VEHICLE MILES PER ACTIVE VEHICLE
 BY MODE
 SECTION 15 1983-1987

	1983	1984	1985	1986	1987
MOTOR BUS	25,663.6	28,871.7	30,257.5	29,837.2	30,977.7
RAPID RAIL	40,409.7	47,975.7	48,341.8	49,342.8	47,364.7
STREET CAR	17,685.6	23,033.5	20,327.5	20,771.0	20,196.4
TROLLEY BUS	21,804.1	23,035.4	22,931.7	24,839.5	20,960.3
DEMAND RESPONSE	8,411.5	8,842.5	9,891.2	8,765.1	9,073.4
COMMUTER RAIL	N/A	34,083.6	38,514.5	36,421.0	34,959.0

- o The performance measure presented on the facing page measures accident frequency (not severity) since it shows the miles and hours between collision accidents. Higher values represent better performance.
- o Safety performance, as measured in vehicle miles and hours per collision accident, varied directly with traffic congestion and exposure. In 1987, for example:
 - Rapid rail recorded a significantly greater number of vehicle miles and hours between collision accidents than other modes.
 - Commuter rail ranks second to rapid rail in both miles and hours between collision accident.
 - Streetcar and trolley bus systems generated fewer vehicle miles and hours between accident than other modes.
- o With the exception of demand response systems and commuter rail, every mode increased the miles and hours between accidents in 1987 over 1986.

TRANSIT INDUSTRY SAFETY PERFORMANCE
 VEHICLE MILES AND HOURS PER COLLISION ACCIDENT
 BY MODE
 SECTION 15 1987



TRANSIT INDUSTRY SAFETY PERFORMANCE
 ANNUAL VEHICLE MILES AND HOURS
 PER COLLISION ACCIDENT
 BY MODE
 SECTION 15 1987

	VEH MILE/ COLL ACCIDENT	VEH HOUR/ COLL ACCIDENT
MOTOR BUS	23,412.7	1,828.2
RAPID RAIL	2,723,468.3	144,103.9
STREET CAR	17,013.5	1,465.8
TROLLEY BUS	10,972.6	1,396.4
DEMAND RESPONSE	34,822.1	2,478.3
COMMUTER RAIL	1,113,327.6	16,092.6



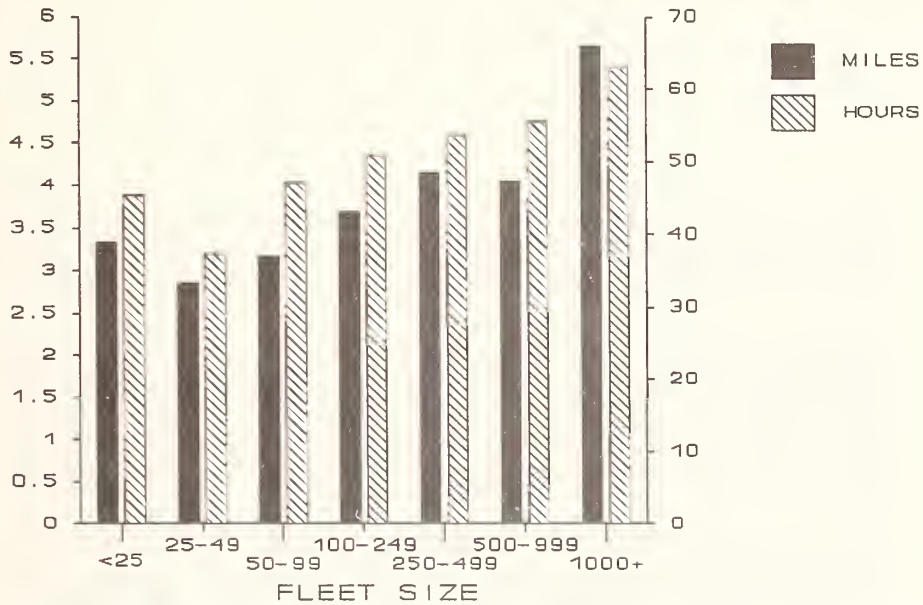
**C. MOTOR BUS PERFORMANCE MEASURES
BY FLEET SIZE**

- o Motor bus system operating expenses per revenue mile or hour (a resource efficiency indicator) typically increased (i.e. worsened) as fleet size increased.
- o In 1987, the group of largest motor bus systems--those systems with the highest service demands and labor requirements showed average per hour and mile expenses approximately twice as high as the motor bus systems with fleets of 25 to 49 vehicles.
- o The most significant results in 1987 over 1986 were in the motor bus systems operating fleets with 25 or less vehicles. They had increased costs per vehicle mile and per vehicle revenue hour of over 25 percent.

MOTOR BUS COST EFFICIENCY
 OPERATING EXPENSE PER VEHICLE REVENUE MILE AND HOUR
 BY FLEET SIZE
 SECTION 15 1987

OPER EXP/VEH REV MI

OPER EXP/VEH REV HR



MOTOR BUS COST EFFICIENCY
 OPERATING EXPENSE PER VEHICLE REVENUE MILE AND HOUR
 BY FLEET SIZE
 SECTION 15 - 1987

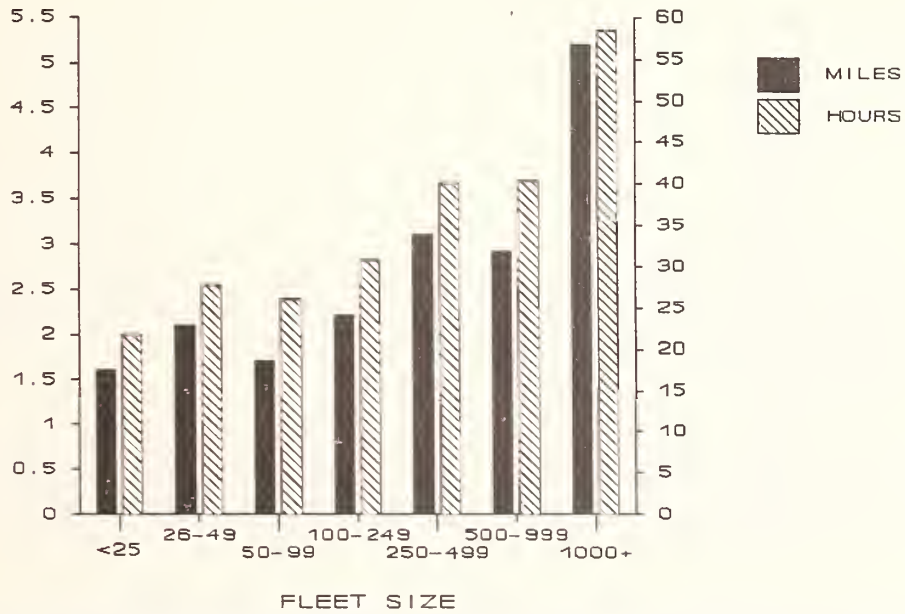
FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND ABOVE
OPER EXP/VEH REV MILE	3.33	2.85	3.17	3.68	4.15	4.05	5.66
OPER EXP/VEH REV HOUR	45.30	37.23	47.10	50.89	53.70	55.60	63.19

(Dollars)

- o The indicators shown on the facing page measure motor bus transit system service effectiveness. The indicators consider service use (i.e. ridership) in relation to service availability.
- o Average service effectiveness, as measured in unlinked passenger trips per revenue mile and hour, tended to increase (i.e. improve) with fleet size group. In 1987, passenger trips per vehicle revenue mile for the group of largest motor bus systems was over 3.3 times the average for the group of smallest motor bus systems.
- o The average unlinked passenger trips per vehicle revenue hour for the group of largest motor bus systems were nearly three times the average for the group of smallest motor bus systems.
- o There was an across the board decline in both trips per mile and trips per hour in the range of 2 percent to 9 percent in 1987. The motor bus systems operating fleets of 50 to 99 vehicles had the largest decreases with 9.2 percent and 13.5 percent for trips per mile and trips per hour respectively.

MOTOR BUS SERVICE EFFECTIVENESS
 UNLINKED PASSENGER TRIPS PER VEHICLE REVENUE MILE AND HOUR
 BY FLEET SIZE
 SECTION 15 1987

UNL PASS TRIPS/ VEH REV MI UNL PASS TRIPS/VEH REV HR



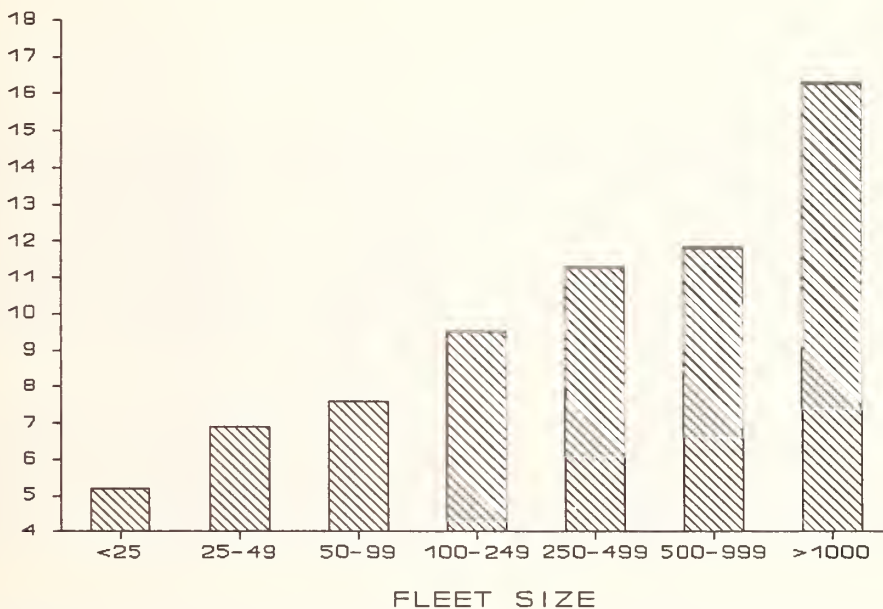
MOTOR BUS SERVICE EFFECTIVENESS
 UNLINKED PASSENGER TRIPS PER VEHICLE REVENUE MILE AND HOUR
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	26-49	50-99	100-249	250-499	500-999	1,000 AND ABOVE
UNL PASS TRIP/VEH REV MILE	1.6	2.1	1.7	2.2	3.1	2.9	5.2
UNL PASS TRIP/VEH REV HOUR	21.8	27.7	26.0	30.8	40.0	40.3	58.5

- o The indicator shown on the facing page is a measure of service effectiveness. It measures the average number of passengers per vehicle while the vehicle is in revenue service (i.e. not deadheading).
- o The average number of passengers per vehicle tend to increase with fleet size category. Motor bus systems with 1,000 or more vehicles had on average 16.30 passengers, 3 times motor bus systems with less than 25 vehicles.
- o Only the 500 to 999 vehicles systems experienced an increase in their passengers per vehicle factor in 1987 over 1986. It increased by 3.7 percent. While the less than 25 vehicles systems, passengers per vehicle factor decreased by 56 percent, most of the systems had decreases in the 3 percent to 10 percent range.

MOTOR BUS SERVICE EFFECTIVENESS
 ANNUAL PASSENGER MILES PER VEHICLE REVENUE MILE
 BY FLEET SIZE
 SECTION 15 1987

ANN PASS MILE/VEH REV MILE



MOTOR BUS SERVICE EFFECTIVENESS
 ANNUAL PASSENGER MILES PER VEHICLE REVENUE MILE
 BY FLEET SIZE
 SECTION 15 - 1987

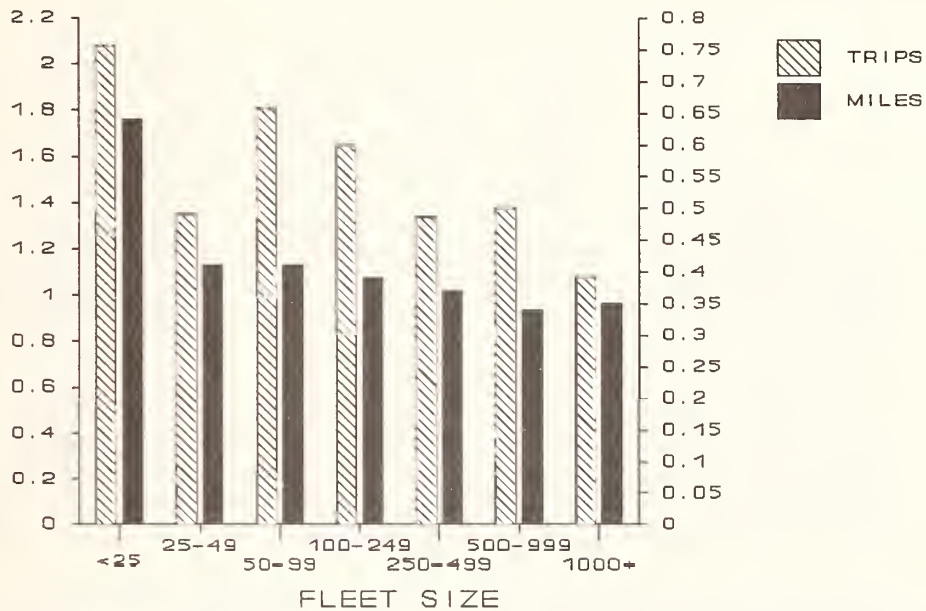
FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND ABOVE
ANN PASS MILE/VEH REV MILE	5.2	6.9	7.6	9.5	11.3	11.8	16.3

- o Motor bus system operating expenses per passenger trip and passenger mile (both resource effectiveness indicators) tended to diminish (i.e. improve) as fleet size increased. Large systems exhibited significantly lower costs per passenger trip and passenger mile than smaller systems. In 1987, for example, the group of largest motor bus systems showed average per passenger trip expenses 22 percent lower than the next largest system group and nearly 32 percent lower than the smallest motor bus systems group.
- o The operating expenses per motor bus passenger trip in 1987 ranged from \$1.08 for the largest systems to \$2.08 for the smallest systems and the operating expenses per annual passenger mile ranged from \$0.34 for the smallest systems to \$0.64 for systems of less than 25 vehicles.
- o Only the 500 to 999 vehicles systems experienced a reduction (4.5 percent) in its expenses per passenger mile in 1987 over 1986. While most other systems increased expenses per passenger mile in the 3 to 9 percent range, the systems with less than 25 vehicles in had increased costs of almost 125 percent.
- o All motor bus systems except systems operating 500 to 999 vehicles had increased operating expenses on a per trip basis in 1987 over 1986.

MOTOR BUS COST EFFECTIVENESS
 OPERATING EXPENSE PER UNLINKED PASSENGER TRIPS
 AND ANNUAL PASSENGER MILES
 BY FLEET SIZE
 SECTION 15 1987

OPER EXP/UNL PASS TRIP

OPER EXP/PASS MILE

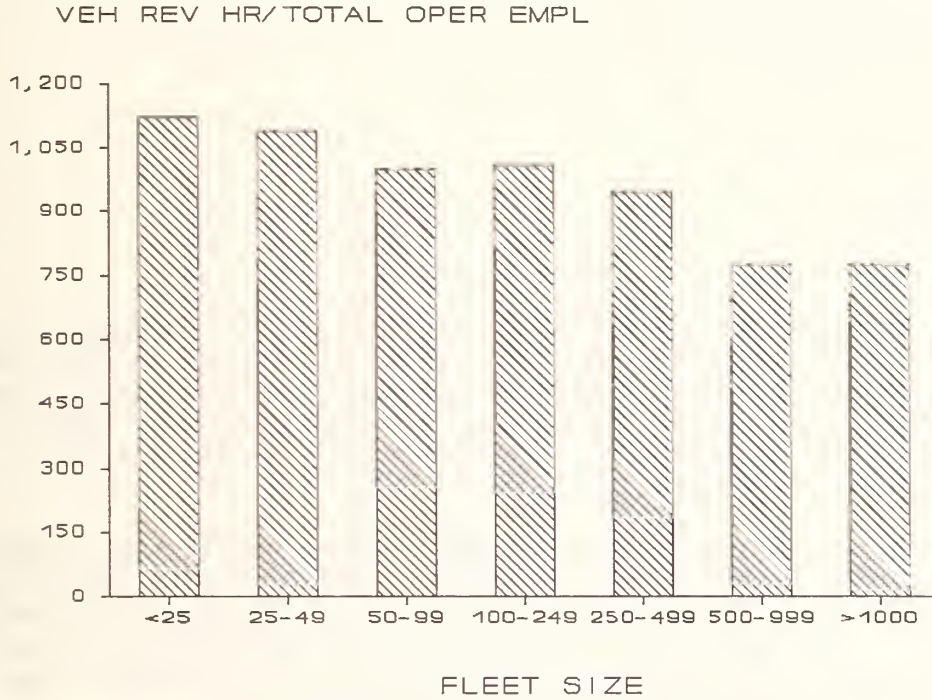


MOTOR BUS COST EFFECTIVENESS
 OPERATING EXPENSE PER UNLINKED PASSENGER TRIPS
 AND ANNUAL PASSENGER MILES
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND ABOVE
OPER EXP/UNL PASS TRIP	2.08	1.35	1.81	1.65	1.34	1.38	1.08
OPER EXP/ANN PASS MILE	0.64	0.41	0.41	0.39	0.37	0.34	0.35

- o The measure on the facing page provides information on the number vehicle revenue hours of service provided per operating employees utilized. Employees that work on capital improvements are not included.
- o In general, the ratio of vehicle revenue hours of service per operating employee decreased with larger fleet size groups. Motor bus systems in the three largest system groups typically had 16 to 31 percent fewer vehicle revenue hours of service per employee in 1987 than the smallest transit systems.
- o In general, there were only slight increases (1 to 4 percent) in vehicle revenue hours per operating employee in 1987 over 1986 except for motor bus systems operating 250 to 499 vehicles which experienced an increase of vehicle revenue hours per operating employee of 10 percent.

MOTOR BUS LABOR EFFICIENCY
 VEHICLE REVENUE HOURS PER TOTAL OPERATING EQUIVALENT EMPLOYEE
 BY FLEET SIZE
 SECTION 15 1987

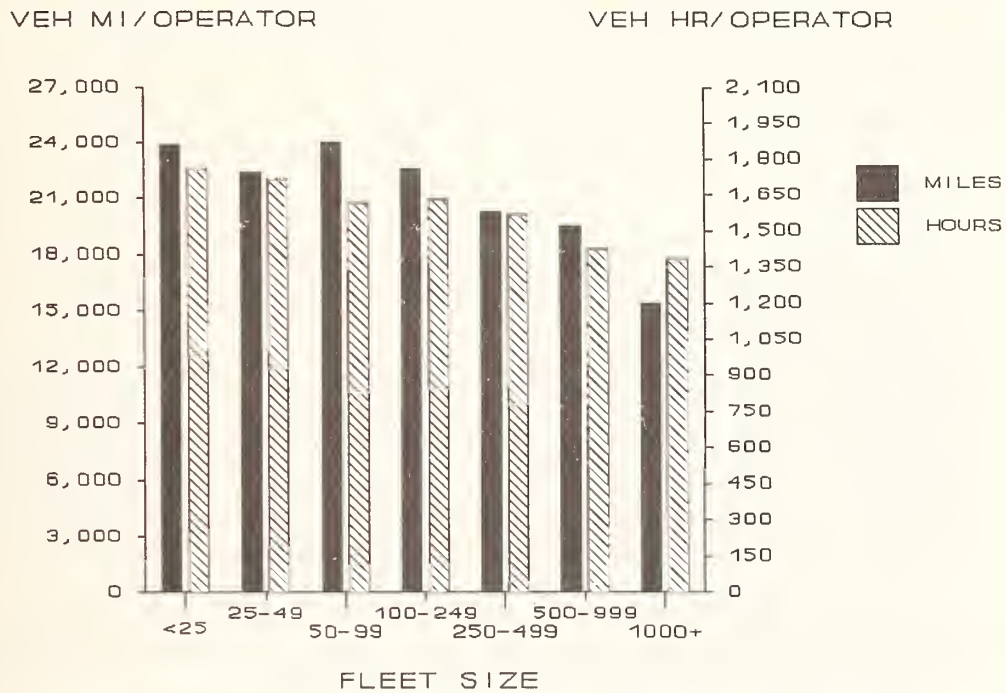


MOTOR BUS LABOR EFFICIENCY
 VEHICLE REVENUE HOURS PER TOTAL OPERATING EQUIVALENT EMPLOYEE
 BY FLEET SIZE
 SECTION 15 - 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER
VEH REV HRS/ TOTAL OPER EMPL	1,122.3	1,089.2	998.3	1,009.3	945.7	776.0	775.1

- o The measures on the facing page provide information on the utilization of vehicle operators. They measure the average number of miles and hours of motor bus operation per operator, including deadhead travel time. Many factors influence this measure, in particular transit system service schedule, labor agreements, and management practices.
- o Revenue vehicle operators of smaller motor bus systems tended to drive more annual vehicle miles and hours than did operators of larger motor bus systems. For example, operators of motor bus systems with fleet sizes of less than 25 vehicles drove 54.7 percent more annual miles and 27.1 percent hours miles in 1987 than did operators of the largest motor bus systems.
- o All systems had decreases of vehicle miles and hours per operators in the 3 to 8 percent range in 1987 over 1986 except for motor bus systems operating 500 to 999 vehicles and those operating more than 1,000 vehicles which experienced decreases of 16 percent and 12 percent respectively.

MOTOR BUS LABOR EFFICIENCY
 VEHICLE MILES AND HOURS PER EQUIVALENT OPERATOR
 BY FLEET SIZE
 SECTION 15 1987



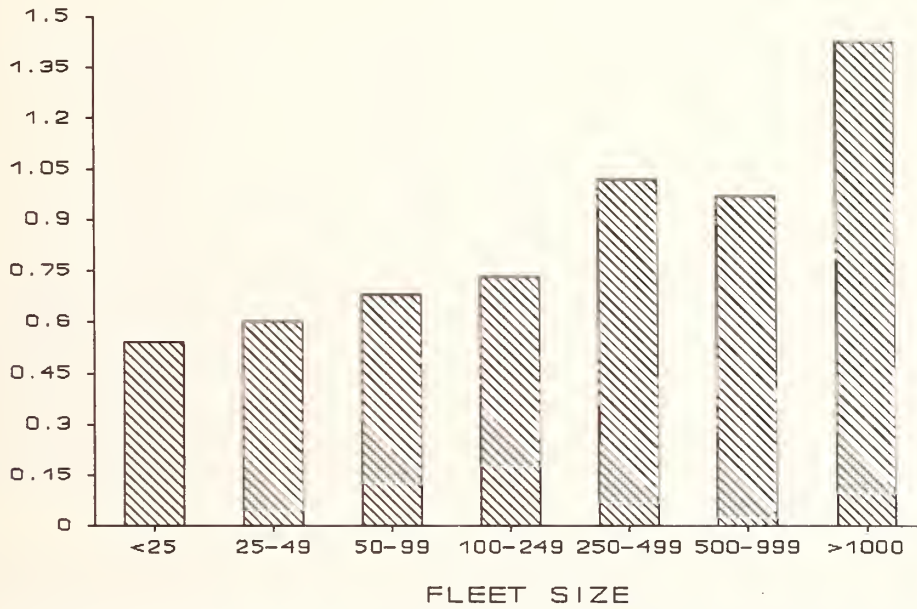
MOTOR BUS LABOR EFFICIENCY
 VEHICLE MILES AND HOURS PER EQUIVALENT OPERATOR
 BY FLEET SIZE
 SECTION 15 - 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND OVER
VEH MI/OPERATOR	23,863.0	22,378.5	23,981.9	22,550.5	20,270.4	19,527.4	15,423.9
VEH HR/OPERATOR	1,756.4	1,715.3	1,612.7	1,630.5	1,568.4	1,423.8	1,381.6

- o The performance indicator on the facing page measures transit system resource efficiency.
- o Among motor bus fleet size groups in 1987, maintenance expenses per vehicle mile indicated that larger motor bus systems had generally higher maintenance costs in relation to service outputs than smaller systems. However, this could be misleading because the data available does not capture the expenses for those systems which contract for the maintenance of their vehicles.
- o Motor bus systems operating the largest number of vehicles had maintenance expenses per vehicle mile about 2.6 times motor bus systems operating with less than 25 vehicles.
- o All systems had maintenance costs per vehicle mile increases in 1987 over 1986. The largest increase was 16.6 percent experienced by systems operating 100 to 249 vehicles. The largest systems had increases of 12 percent to 15 percent while the smallest systems had increases of 4 percent to 10 percent.

MOTOR BUS MAINTENANCE EFFICIENCY
 MAINTENANCE EXPENSE PER VEHICLE MILE
 BY FLEET SIZE
 SECTION 15 1987

MAINT EXP/VEH MILE



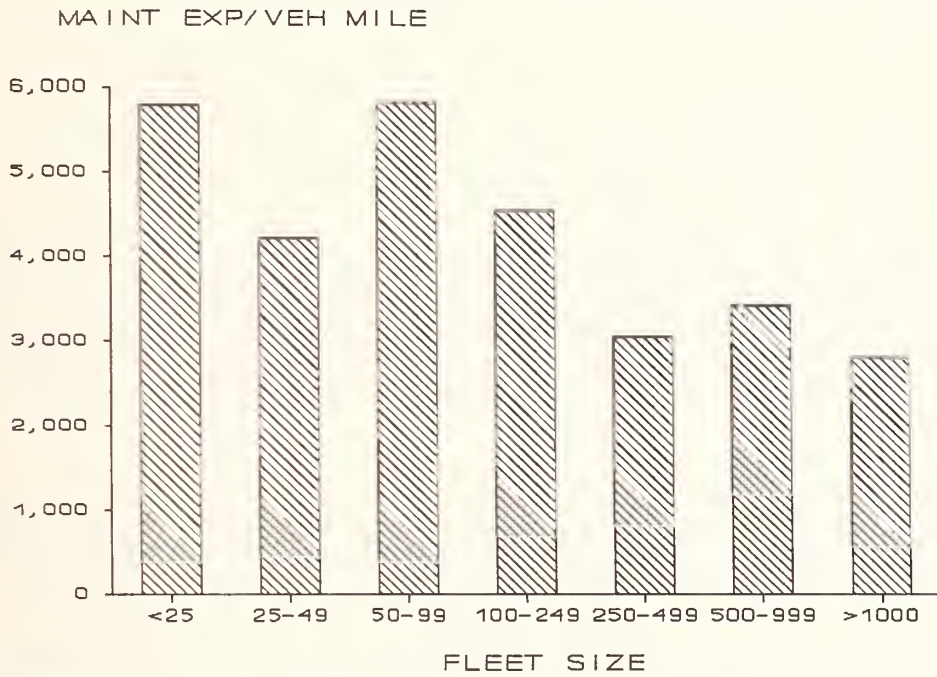
MOTOR BUS MAINTENANCE EFFICIENCY
 MAINTENANCE EXPENSE PER VEHICLE MILE
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER
MAINT EXP/VEH MILES	0.54	0.60	0.68	0.73	1.02	0.97	1.43

(Dollars)

- o The indicator on the facing page is generally used as a measure of maintenance effectiveness. The values of the indicator are influenced by many factors: fleet age, maintenance expenditures, mechanic skills, terrain and climate. Although Section 15 provides a definition for roadcalls, to insure consistent reporting, there have been some problems attaining consistency. Many transit systems continue to count roadcalls using definitions different from those specified by UMTA.
- o Motor bus transit systems operating larger numbers of vehicles generally had fewer vehicle miles between roadcalls than did systems operating smaller number of vehicles.
- o Every system group increased the number of miles between roadcalls in 1987 over 1986.

MOTOR BUS MAINTENANCE EFFICIENCY
 VEHICLE MILES PER MECHANICAL ROADCALL
 BY FLEET SIZE
 SECTION 15 1987



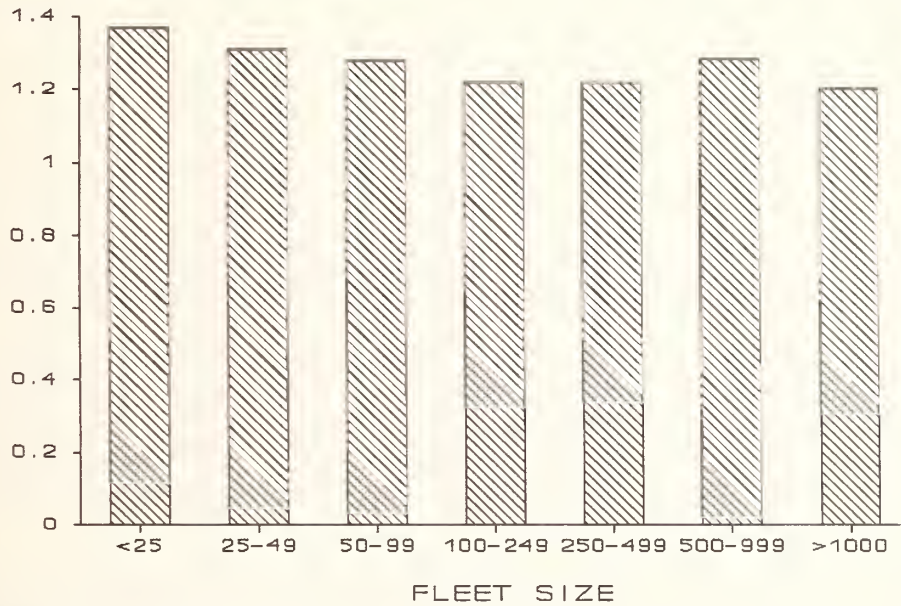
MOTOR BUS MAINTENANCE EFFICIENCY
 VEHICLES MILES PER MECHANICAL ROADCALL
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND OVER
VEH MILES/ MECH ROADCALL	5,792.6	4,212.8	5,819.6	4,537.3	3,046.2	3,426.5	2,815.5

- o The ratio of vehicles in the total active fleet to the maximum service indicated relatively little variation in spare ratios among fleet size groups with between 25 and 999 vehicles. Each of these five groups have spare ratios of between 22 and 31 percent. However, there was not much change in most systems in 1987 over 1986.
- o Motor bus systems with over 1,000 vehicles had the smallest average spare ratio (20 percent) and motor bus systems with less than 25 vehicles had the largest average spare ratio (37 percent). However, there was not much change in most systems in 1987 over 1986.
- o From the information provided here, spare ratios can be computed on the basis of the relationship between spare vehicles and total active fleet vehicles; the size of the spare vehicle fleet represents the difference between the number of vehicles in maximum scheduled service and the number of vehicles in the active fleet. UMTA uses a different method for computing the spare ratio (see UMTA Circular 9030.1). For capital grant purposes, UMTA relates total spares to the number of vehicles in maximum service.

MOTOR BUS SPARE RATIO
TOTAL ACTIVE VEHICLES TO VEHICLES OPERATED IN MAXIMUM SERVICE
BY FLEET SIZE
SECTION 15 1987

ACTIVE VEHICLES/VOMS

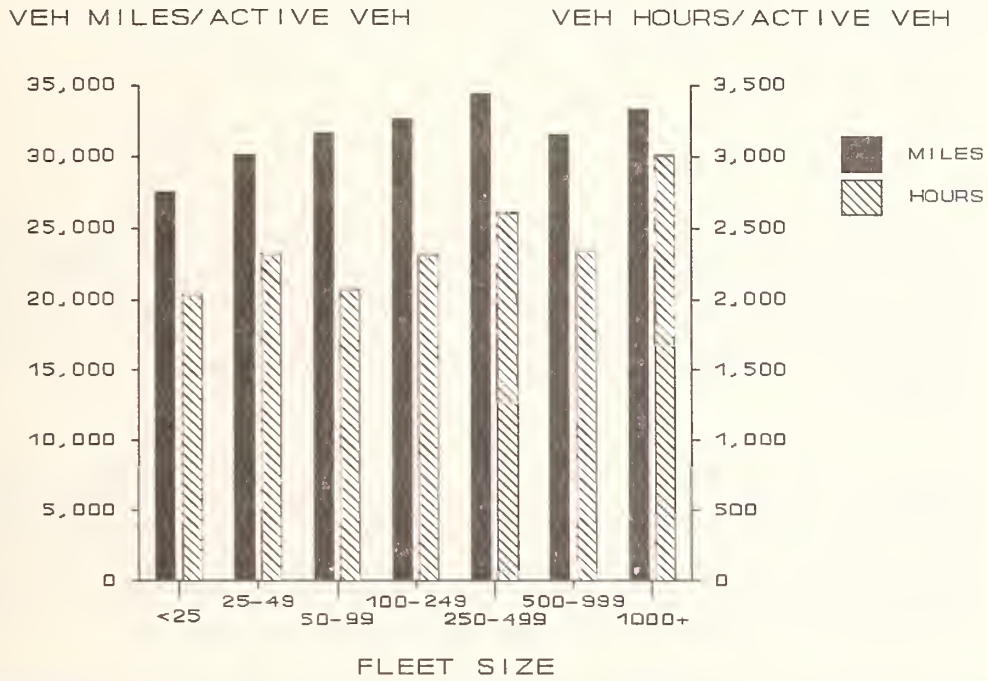


MOTOR BUS SPARE RATIO
TOTAL ACTIVE VEHICLES TO VEHICLES OPERATED IN MAXIMUM SERVICE
BY FLEET SIZE
SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER
ACTIVE VEH/VOMS	1.4	1.3	1.3	1.2	1.2	1.3	1.2

- o The ratios on the facing page measure annual vehicle utilization in terms of both the hours and miles of service provided.
- o No clear pattern of variation existed among motor bus fleet size average statistics for miles or hours of service per active vehicle. On average motor bus systems seem to have operated their vehicles between 27,000 and 33,000 miles per year. Average measures for vehicle hours per active vehicle suggest slower operating speeds by the largest systems.
- o While the largest systems experienced slight changes in vehicle miles and vehicle hours per active vehicle in 1987 over 1986, the small motor bus systems (operating less than 250 vehicles) generally had increases in both categories of 6 percent to 8 percent except transit systems with less than 25 vehicles which had decreases of about 9 percent.

MOTOR BUS VEHICLE UTILIZATION
 VEHICLE MILES AND HOURS PER ACTIVE VEHICLE
 BY FLEET SIZE
 SECTION 15 1987

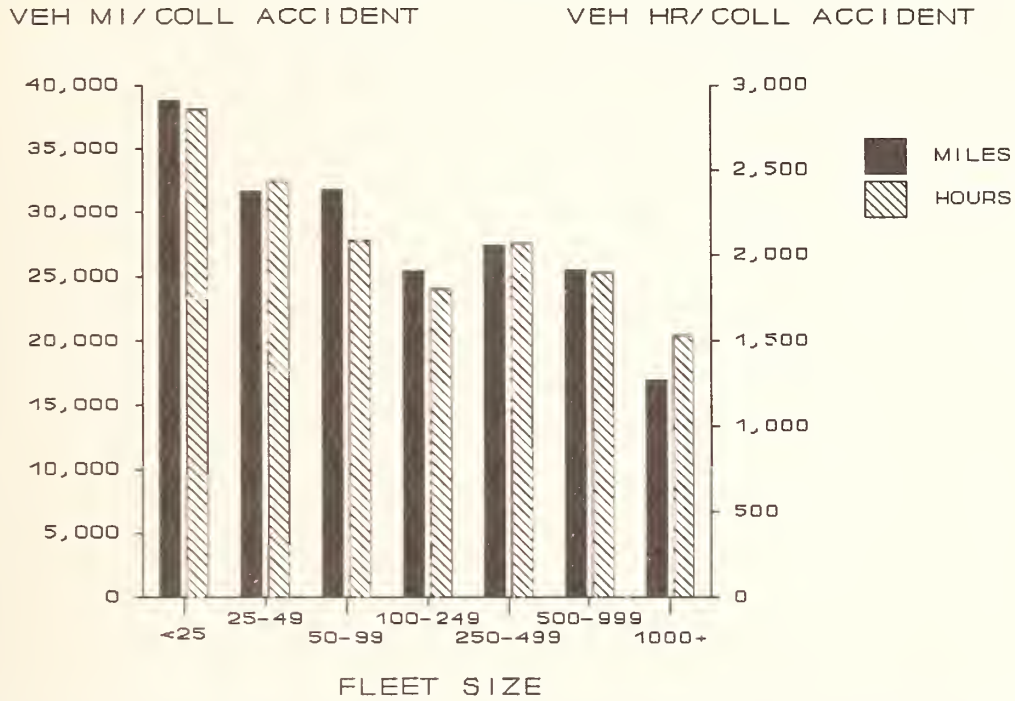


MOTOR BUS VEHICLE UTILIZATION
 VEHICLE MILES AND HOURS PER ACTIVE VEHICLE
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1000 AND OVER
VEH MILES/ACTIVE VEH	27,508.8	30,092.5	31,574.6	32,567.1	34,384.6	31,512.7	33,248.8
VEH HOURS/ACTIVE VEH	2,028.6	2,315.1	2,071.4	2,312.7	2,606.1	2,348.2	3,008.6

- o The measure shown on the facing page is generally used to evaluate transit system safety performance, since it provides information on the vehicle miles and hours between collision accidents (i.e. collision accident frequency). This measure does not provide information on the severity, costs or likelihood of collision accidents.
- o Average vehicle hours and miles per collision accident tend to decrease as motor bus fleet size group increases, suggesting a correlation between traffic exposure and safety performance. Motor bus services in the largest system groups typically operate in more congested service areas and thus are likely to have a higher incidence of accidents in relation to service supplied.
- o Every motor bus grouping increased (3 to 21 percent) their vehicle miles and hours between collision accidents in 1987 over 1986 except for systems with 50 to 99 vehicles and systems with more than 1,000 vehicles. Systems with more than 1,000 vehicles had decreases by 4 percent in their vehicle miles and vehicle hours between collision accidents. Systems with 50 to 99 vehicles had decreases by 4 percent in their vehicle hours per collision accident while their vehicle miles per collision accident increased by 1 percent.

MOTOR BUS SAFETY PERFORMANCE
 VEHICLE MILES AND HOURS BETWEEN COLLISION ACCIDENTS
 BY FLEET SIZE
 SECTION 15 1987



MOTOR BUS SAFETY PERFORMANCE
 VEHICLES MILES AND HOURS BETWEEN COLLISION ACCIDENTS
 BY FLEET SIZE
 SECTION 15 1987

FLEET SIZE -->	<25	25-49	50-99	100-249	250-499	500-999	1,000 AND OVER
VEH MI/COLL ACDT	38,782.6	31,586.9	31,687.3	25,372.3	27,311.9	25,472.7	16,893.6
VEH HR/COLL ACDT	2,860.0	2,430.0	2,078.8	1,801.7	2,070.0	1,898.2	1,528.6







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