BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Secretary Of Transportation

DOT Needs Better Assurance That Transit Systems Are Maintaining Buses

Although the Department of Transportation has provided substantial funds to support bus purchases by local transit systems, it has not systematically monitored how well buses are maintained. As a result, DOT has little assurance that its sizable investment is adequately protected.

GAO found that bus reliability in many transit systems is deteriorating and that timely preventive maintenance is not always performed.

The Congress has passed legislation to increase emphasis on maintenance. GAO proposes recommendations to assist in implementing this legislation.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-210955

The Honorable Elizabeth H. Dole
The Secretary of Transportation

Dear Madam Secretary:

This report discusses the need for the Urban Mass Transportation Administration to have better assurance that the substantial Federal investment in transit buses is adequately protected through proper maintenance. The report contains recommendations to you on page 15.

As you know, 31 U.S.C. §720 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

In addition to the committees mentioned above, we are sending copies of this report to the House Committee on Public Works and Transportation and the Senate Committee on Banking, Housing and Urban Affairs. Copies are also being sent to your Assistant Secretary for Administration.

Sincerely yours,

J. Dexter Peach
Director

GENERAL ACCOUNTING OFFICE
REPORT TO THE SECRETARY
OF TRANSPORTATION

DOT NEEDS BETTER ASSURANCE THAT TRANSIT SYSTEMS ARE MAINTAINING BUSES

D I G E S T

The Department of Transportation's Urban Mass Transportation Administration (UMTA) has spent billions of dollars to assist local transit authorities in purchasing buses and related equipment and facilities. However, UMTA lacks assurance that proper bus maintenance is performed and, consequently, that the substantial Federal investment is adequately protected. Growing concern over maintenance problems prompted GAO to make this review.

UMTA LACKS GUIDELINES FOR MAINTENANCE OVERSIGHT

Although UMTA requires grantees to maintain buses purchased with Federal assistance, it has no policy or guidelines explaining what adequate maintenance is nor has it systematically evaluated how well vehicles purchased with Federal assistance are maintained. (See pp. 4 to 6.)

In 1981 UMTA attempted to develop a Federal maintenance policy but encountered problems in developing universally applicable standards. For example, local variables such as climate and terrain can affect the frequency of certain maintenance activities. UMTA was also concerned about the Federal resources needed to make sure that the policy was implemented.

MAINTENANCE ACTIVITIES NOT ALWAYS TIMELY

The scope and severity of maintenance problems nationwide is largely unknown. However, GAO examined the preventive maintenance activities of six major transit systems and found that buses did not always receive timely preventive maintenance (generally scheduled according to mileage), which could affect their reliability and useful life. In randomly selected records at one system, for example, over one-third of a year's scheduled maintenance activities were performed at least 1,000 miles late. Records sampled at another system indicated that

78 percent of scheduled maintenance activities were at least 1,000 miles late. Transit officials generally viewed acceptable degrees of lateness as ranging from 200 miles to 1,000 miles. (See pp. 7 to 11.)

The reliability of many transit systems' vehicles appears to be decreasing. According to UMTA statistics, about 60 percent of transit systems receiving Federal assistance with fleets of 100 or more buses reported a decline in the reliability of their buses for the year ending June 1980--the latest data available at the time of GAO's review. A GAO telephone survey of 40 of the largest transit systems showed that about 42 percent had experienced performance declines over the last 3 years. While other factors, such as climate and terrain, can also affect bus performance, GAO believes that some of the decline may be attributed to untimely or inadequate maintenance. (See p. 11.)

OBSTACLES TO PERFORMING TIMELY MAINTENANCE

It is to a transit operator's own benefit to adequately maintain vehicles because it increases service efficiency and reliability. However, many operators apparently lack the resources to carry out preventive maintenance programs despite the availability of Federal operating assistance. GAO's survey of 40 transit systems indicated that almost half were concerned about inadequate mechanic training. Other concerns included a lack of mechanics, inadequate maintenance facilities, and more sophisticated vehicles requiring more maintenance. These obstacles could become more severe if local budgets become tighter. (See pp. 12 and 13.)

In addition to obstacles faced by local operators, some researchers believe that the grant procedures for bus purchases have not provided enough incentive for maintenance because the transit system bears relatively little of the new bus cost (20 percent). The researchers believe that this encouraged transit systems to expand their fleet sizes beyond what they can afford to keep up.

CONGRESSIONAL INITIATIVES ADDRESSING MAINTENANCE PROBLEMS

The Federal Public Transportation Act of 1982, enacted in January 1983, retained the capital grant program and added a block grant program that provides assistance for capital needs or operating expenses, including maintenance, as the system sees fit. The block grant program requires that transit systems certify that maintenance will be performed and that the certifications will be independently audited. (See pp. 1 and 6.)

While not specifically calling for certification and independent audit, the capital grant program was amended to require the Secretary of Transportation to determine that the grantee has or will have sufficient capability to maintain facilities and equipment. GAO believes that the certification and independent audit approach to be used for block grants would also improve oversight for the capital grant program.

Before certification and independent audit procedures can be effective, however, UMTA must first develop a bus maintenance policy with guidelines on what constitutes an adequate maintenance program and criteria for evaluating programs. Without that policy, it would be difficult to interpret what the maintenance certifications mean. UMTA could use guidelines recently published by the American Public Transit Association in developing the policy. The fact that the association's guidelines are flexible and were developed by industry should help to minimize UMTA's past problems in developing universally acceptable maintenance standards. (See p. 5.)

RECOMMENDATIONS

GAO recommends that the Secretary of Transportation direct the Administrator of UMTA to work with the transit industry and develop a Federal bus maintenance policy with flexible guidelines on what constitutes an adequate maintenance program and criteria to evaluate maintenance programs.

GAO also recommends that the Secretary direct the Administrator to require that Federal capital grant assistance for bus purchases be

subject to maintenance certification and independent audit provisions similar to those required for block grants. The amount of future Federal grant assistance should be dependent on correction of maintenance program deficiencies. (See p. 15.)

AGENCY COMMENTS

The Department agreed that UMTA lacked maintenance guidance and oversight. (See app. II.) It stated that it is developing a maintenance policy that is compatible with the American Public Transit Association's guidelines and that the new certification and independent audit requirements contained in the Federal Public Transportation Act of 1982 should increase maintenance oversight. Additionally, the Department said that it will perform a full review of the grantee at least once every 3 years.

The Federal Public Transportation Act of 1982 was enacted while GAO's draft report was with the Department for comment. As a result of the act, GAO modified one of its proposals which basically endorsed a maintenance certification and independent audit approach contained in then pending legislation. The final recommendation is aimed at assuring that a similar maintenance oversight approach is used for bus purchases under capital grants as well as block grants. Department officials told GAO that their plans for implementing the block grant oversight procedures would also cover capital grants. (See p. 15.)

INDUSTRY COMMENTS

The American Public Transit Association stated that rigid Federal maintenance standards should be avoided and that Federal operating assistance is essential to support maintenance. It also emphasized that the primary obstacle hindering maintenance activities was limited resources. (See p. 16.)

Contents

ABBREVIATIONS

DOT	Department of Transportation
MBTA	Massachusetts Bay Transportation Authority
SCRTD	Southern California Rapid Transit District
SEPTA	Southeastern Pennsylvania Transportation Authority
UMTA	Urban Mass Transportation Administration
WMATA	Washington Metropolitan Area Transit Authority

CHAPTER 1

INTRODUCTION

As part of an overall mandate to improve mass transportation, the Urban Mass Transportation Administration's (UMTA's) capital grant programs have significantly aided transit bus systems by contributing funds to purchase new buses and related equipment and facilities. These funds have assisted in (1) replacing many buses that were no longer cost effective to operate, (2) expanding bus fleets to help meet the increased demand for transit service, (3) improving garage and other support facilities, and (4) purchasing related support equipment such as radios, passenger shelters, bus stop signs, spare engines, etc. Federal assistance in this area has grown to about $900 million annually. It is generally agreed that maintenance is an important factor in assuring that the substantial investment in transit equipment and facilities is adequately protected.

FEDERAL INVESTMENT IN MASS TRANSIT BUSES IS SUBSTANTIAL

Since 1964 the Federal Government has attempted to improve mass transit bus systems by providing funding assistance through UMTA for more than 49,000 transit buses. From fiscal year 1965 through the end of fiscal year 1981, UMTA devoted about $5.5 billion to the procurement of transit buses, equipment, and facilities.

Bus purchase projects are funded at up to 80 percent of cost. Additionally, some transit systems pay even less than 20 percent because State and local funds are also available to fund new buses. For example, a transit system in Pennsylvania paid only 3.3 percent of the purchase price of a new bus (about $5,000 for a new $150,000 bus).

About 97 percent of all transit buses purchased with Federal assistance during fiscal years 1965-81 were funded through the Urban Mass Transportation Act's section 3 and section 5 programs. While the act did not earmark specific funds for maintenance, transit operators were allowed to use section 5 operating grants to assist in implementing maintenance programs.

At the time our draft report was with the agency for comment, the Congress passed the Federal Public Transportation Act of 1982. Signed into law in January 1983, the act provides for a major restructuring of mass transit assistance. It establishes block grants to replace section 5 assistance beginning in 1984. With certain restrictions, a transit system can use the block grant for capital assistance or operating assistance, including maintenance. Capital grants under section 3 will be continued until at least 1986. The Federal share of the grants will drop from 80 percent to 75 percent.

MAINTENANCE: A KEY INGREDIENT TO EFFICIENT TRANSIT SERVICE

Bus manufacturers, UMTA, and the transit industry believe that bus condition, efficiency, and reliability are related to the degree of systematic maintenance performed. Systematic maintenance generally includes such activities as washing the vehicle's exterior, interior, engine, and chassis; checking brake condition, oil levels, and transmission fluids; changing oil; lubricating the chassis; and inspecting for worn parts.

Although systematic maintenance practices have been found effective in reducing service interruptions and ensuring that useful life and operating expectancy are met, other factors can also affect bus performance. For example, poor quality vehicles, harsh climates, and bad roads tend to shorten relative vehicle life. Because of these variables, it is difficult to establish a quantifiable relationship between systematic maintenance and bus performance.

OBJECTIVES, SCOPE, AND METHODOLOGY

We reviewed transit system bus maintenance activities because of the substantial public investment in transit buses and the growing concern over how well transit buses were being maintained. Our principal objective was to determine if transit buses purchased with UMTA funds were being adequately maintained. To meet this objective, we obtained information on (1) the extent to which selected transit systems adhere to their own prescribed preventive maintenance program, (2) the effect of preventive maintenance problems on transit performance, (3) the obstacles to timely preventive maintenance practices, (4) what controls UMTA has to assure that federally funded buses are being maintained, and (5) what additional actions, if any, should be taken to improve transit bus preventive maintenance. The review was made in accordance with generally accepted government audit standards.

We conducted our review at six major U.S. transit systems chosen primarily on the basis of geographic dispersion, climatic differences, and bus fleet size. The transit systems reviewed were: Massachusetts Bay Transportation Authority, Boston, Massachusetts; Metropolitan Transit Authority of Harris County, Houston, Texas; Municipality of Metropolitan Seattle, Seattle, Washington; Southeastern Pennsylvania Transportation Authority, Philadelphia, Pennsylvania; Southern California Rapid Transit District, Los Angeles, California; and Washington Metropolitan Area Transit Authority, Washington, D.C. According to UMTA's June 1982 section 15 report, the six transit systems operate

about 18 percent of the approximately 50,000 buses in 321 public transit systems.[1] This report, containing statistics for the year ending June 1980, was the most recent report at the time of our review.

In evaluating adherence to prescribed preventive maintenance programs and the extent, effect, and cause of preventive maintenance problems, we reviewed maintenance records for randomly selected buses and gathered and analyzed other relevant bus maintenance data. This data included preventive maintenance schedules, accidents, breakdowns, damage, fleet size, and in service delays. Because some of the information on maintenance program adherence and bus performance was obtained from many different computer systems, it was impractical for us to verify the accuracy of each transit system's automated data base. In examining maintenance program adherence, we did not evaluate the quality of repair work.

In evaluating the scope of preventive maintenance problems and the obstacles to performing timely preventive maintenance inspections, during August and September 1982 we interviewed by telephone transit maintenance officials at 40 of the 60 largest U.S. transit systems, each having fleets of at least 190 buses. (See app. I.) We selected the 40 systems primarily on the basis of size. These transit systems combined with the 6 transit systems that we visited represent approximately 72 percent of the total number of buses in the 321 public transit systems included in UMTA's section 15 report. We also contacted two of the three largest U.S. bus manufacturers, GMC Truck and Bus Group and Grumman Flxible, and the American Public Transit Association for their views on (1) the importance of preventive maintenance and (2) the necessary components for an adequate bus preventive maintenance program.

In evaluating what controls UMTA has to assure that federally funded transit buses are being adequately maintained and what additional actions should be taken to improve transit bus preventive maintenance, we reviewed UMTA's current grant administration funding practices at its headquarters in Washington, D.C., and at its regional offices in San Francisco, California; Seattle, Washington; and Philadelphia, Pennsylvania.

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[1]This report summarizes financial and operating data submitted annually to UMTA by the Nation's public transit systems that receive Federal assistance.

CHAPTER 2

UMTA HAS LITTLE ASSURANCE THAT BUSES PURCHASED WITH FEDERAL ASSISTANCE ARE PROPERLY MAINTAINED

Although UMTA requires that buses be adequately maintained, it has not developed maintenance guidelines and has not systematically evaluated transit maintenance programs. Consequently, despite substantial Federal expenditures for new bus purchases, UMTA has little information on how well these buses are maintained.

While the national scope and severity of maintenance problems are largely unknown, several major transit systems are experiencing problems. For example, several of the transit systems we examined were unable to comply fully with their own preventive maintenance schedules--an important factor affecting vehicle life and reliability. Additionally, the frequency of bus breakdowns in many systems is increasing which may be caused in part by inadequate maintenance.

The Congress and UMTA have expressed a desire to increase Federal emphasis on maintenance. Recently enacted legislation should help to improve maintenance oversight. However, solutions are not easy. Limited Federal and local resources combined with problems in determining what constitutes an adequate program and by what criteria their implementation should be evaluated have hindered emphasis in the area.

UMTA LACKS GUIDELINES FOR MAINTENANCE OVERSIGHT

UMTA's grant administration practices for bus purchases lack adequately defined maintenance requirements and mechanisms for maintenance oversight. As a result, UMTA has little accurate information on how well buses purchased with Federal assistance are being maintained and little assurance that maintenance problems can be identified. Developing and implementing a Federal maintenance policy to improve monitoring and evaluation have been hindered by problems in developing uniform maintenance standards and limited Federal resources. The Congress has recently passed legislation that should improve maintenance oversight.

Federal maintenance requirements are vague

UMTA requires transit systems to maintain buses purchased with Federal funds as part of the standard grant agreement. However, it has no guidelines or standards explaining what adequate maintenance is.

In January 1981 UMTA attempted to develop more specific guidelines for maintenance requirements. It published a Federal Register notice requesting comments on several alternative approaches concerning (1) what standards should be used to evaluate maintenance, (2) how these standards would be monitored and enforced, and (3) what types of sanctions or penalties should be applied for noncompliance. In discussing the alternatives, UMTA recognized a number of obstacles to implementation of a Federal maintenance policy--principally, the lack of universally accepted maintenance standards and limited Federal resources that could inhibit traditional compliance monitoring.

Comments on the UMTA proposals were largely negative. Many of the transit authorities responding believed that universal standards would be difficult to develop and that enforcement would require a significant increase in Federal resources. Some transit authorities expressed concern that the regulations would contradict the administration's aim of reducing regulatory burden and came at a time when the administration proposed phasing out Federal financial support for maintenance activities.

In August 1982 UMTA withdrew its rulemaking proposals, stating that the material could be more effectively provided to grantees in a nonregulatory document.

Although no Federal standards for bus maintenance exist, the American Public Transit Association published general guidance in 1983 and recommended that industry use it voluntarily. It provides flexible guidelines on the basic components of maintenance programs that local systems can adapt to meet any unique variables in their operating environment. The document includes information on daily, intermediate (approximately 6,000 miles), and long-term (approximately 42,000 miles) maintenance functions. Generally, the guidelines suggest that manufacturers' recommendations be followed unless local experience indicates otherwise. Additionally, American Public Transit Association guidelines call for a maintenance information system to track labor and material costs for maintenance functions and to schedule maintenance activities. The guidelines also stress the importance of a quality assurance program which, according to the guidelines, is not used extensively in the transit industry.

Past Federal oversight has been minimal

UMTA regional offices, responsible for administering grants for bus purchases, have not directly monitored or evaluated maintenance programs. Instead, regional offices have generally relied on indirect measures of bus performance to identify problems with maintenance. These measures may not always have provided the information necessary to assure adequate maintenance.

UMTA internal policy has not required regional offices to monitor maintenance activities or provided guidelines on how to do it. The director of the Seattle regional office stated that UMTA lacks the staff and expertise to monitor and evaluate maintenance activities. Representatives from the San Francisco regional office, including the Director, Transit Assistance Division, were also concerned about limited resources and indicated that they were not always able to visit grant locations even once a year. In its 1981 discussion of proposed maintenance requirements, UMTA acknowledged that additional staff would be needed if it were to review maintenance plans and conduct compliance inspections.

While UMTA regional offices have not evaluated the adequacy of maintenance programs or their implementation, under unwritten office policy they are supposed to examine certain transit performance indicators that may indicate maintenance problems. These examinations are to be carried out during the grant approval process. The performance indicators examined include the age of buses being replaced and the size of a transit system's reserve fleet.[1] Early replacement of buses or excessively large reserve fleets could indicate maintenance problems. While there are no formal written criteria for either indicator, regional offices generally expect a bus to be useful for 12 years and the reserve fleet to be 10 to 15 percent above peak load requirements.

Monitoring vehicle replacement age and reserve fleet size is not always an accurate indicator of maintenance performance. For example, a vehicle's useful life can be affected by climate, road conditions, and vehicle quality--factors that are not related to maintenance. An internal study at one transit authority indicated that a reasonable retirement age for standard buses in its system was 14 to 16 years. Furthermore, monitoring bus retirement age would not identify vehicle reliability problems caused by poor maintenance. Reserve fleet criteria are also affected by variables that may limit their usefulness as an indicator of maintenance problems. For example, a transit authority with a larger proportion of older buses may need a larger reserve fleet than a system made up primarily of new buses.

New legislation increases emphasis on maintenance

The Federal Public Transportation Act of 1982, which was enacted in January 1983, establishes a means for improved

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[1]A reserve fleet is that portion of a system's total fleet that exceeds the number of buses necessary to meet the maximum or peak transit requirements. A reserve fleet is used to offset buses that are not in service due to breakdowns and scheduled preventive maintenance.

maintenance oversight. Under this legislation, the newly established section 9 block grant program requires grant recipients to certify annually that facilities and equipment will be maintained. Additionally, the act requires annual reviews to assure, among other things, that the certification is carried out. The Department of Transportation (DOT) can conduct the review itself or require the grant recipient to obtain an independent review. The act also requires DOT to conduct a full review at least once every 3 years.

In addition to establishing block grants, the act continues to provide capital assistance under the previous section 3 program and other programs. However, section 3 of the act now requires the Secretary of Transportation to determine that a grant recipient has or will have sufficient capability to maintain facilities and equipment. Because the act was passed recently, UMTA has not developed implementing regulations for either section 9 or section 3, as of January 1983, and has had no experience in administering the programs. As a result, it is too early to evaluate what impact the new legislation will have on maintenance.

PROBLEMS IN MAINTAINING VEHICLES

Our review of six major transit systems showed wide variations in the extent of compliance with preventive maintenance programs and, consequently, the degree to which the Federal bus investment in these systems is protected. Reports of problems in maintaining vehicles are not new. During the past 2 years, we and others have expressed concern over maintaining vehicles purchased with Federal assistance. Despite indications of maintenance problems, however, it is difficult to determine the scope or severity of the problems nationwide because UMTA lacks information in the area.

Preventive maintenance is not always timely

We examined preventive maintenance activities at six transit systems and found that maintenance is not always performed on time. Two independent audits of one system, for example, showed that the average number of miles between various maintenance inspections was almost twice the scheduled interval. A sample of records at the other systems showed varying degrees of compliance with preventive maintenance programs. One system performed almost every preventive maintenance inspection within 1,000 miles of schedule. The percentage of activities that were late by at least 1,000 miles at the remaining four systems ranged from 12 percent to 78 percent. As discussed earlier, the precise effects of deferred maintenance are difficult to quantify. However, there is general agreement that if buses are not properly maintained they will break down more frequently and their useful life will be shortened.

All the transit systems reviewed had a program of periodic vehicle inspections during which routine preventive maintenance work is done and major problems are identified and scheduled for future repair. Those inspection intervals scheduled according to mileage generally varied from 1,000 miles to 6,000 miles. We did not evaluate the adequacy of these intervals. However, appropriate maintenance intervals can vary for reasons related to local operating conditions. For example, a transit authority operating in dry, dusty conditions may need to schedule air filter replacement more frequently than an authority in a less dusty environment. The cost of performing maintenance must also be examined. Maintenance intervals that are too short may be costly to comply with without providing corresponding increases in vehicle performance.

Most of the transit systems gave us their views on what they considered acceptable degrees of lateness in meeting preventive maintenance schedules. These generally ranged from 200 miles late to 1,000 miles late. The following summarizes the results of our review of each of the six systems examined.

Southern California Rapid Transit District (SCRTD)

SCRTD operates a fleet of about 2,468 buses--the largest of the systems we reviewed. Its preventive maintenance program consists of inspections at every 6,000-mile interval as well as weekly brake and safety checks. Although it is not a formal objective, the SCRTD Director of Maintenance and Equipment told us that the system attempts to perform inspections within 500 miles of the scheduled time. However, he stated that SCRTD buses could go as many as 500 miles in a day and a half and 1,000 miles in 3 days. As a result, a lateness criterion of 1,000 miles is more realistic.

We reviewed records of about 1,135 preventive maintenance inspections on 150 randomly selected buses for a 1-year period ending March 31, 1982. About 25 percent of the inspections were performed at least 500 miles late. Additionally, about 12 percent of the inspections were late by at least 1,000 miles and 4 percent were late by at least 2,000 miles. SCRTD's Director of Maintenance and Equipment stated that there are many obstacles to preventive maintenance which are interrelated. His concerns were basically resource related and included antiquated facilities, sophisticated and sometimes unreliable new buses, problems in maintaining a corps of skilled mechanics, and the overall logistics required to schedule maintenance for SCRTD's large fleet.

Southeastern Pennsylvania Transportation Authority (SEPTA)

SEPTA operates a fleet of about 1,300 buses and requires preventive maintenance activities (including safety inspections)

to be performed at 2,000-mile intervals. In a meeting with SEPTA officials, including the general manager and assistant general manager, we were told that inspections should be performed within 500 miles of the schedule.

We reviewed records of 476 inspections of 167 randomly selected buses during the period September 1981 to April 1982 and found that 36 percent were late by at least 500 miles, 24 percent were late by at least 1,000 miles, and 5 percent were late by at least 2,000 miles. Transit officials believed the primary reason for deferred maintenance is inadequate emphasis on the part of maintenance supervisors and foremen. For example, they indicated that some supervisors feel that meeting route schedules is a higher priority than performing preventive maintenance.

Washington Metropolitan Area Transit Authority (WMATA)

WMATA, with a fleet of about 2,000 buses, requires preventive maintenance every 5,000 miles or 60 days. It has not formally established an acceptable mileage deviation from scheduled maintenance intervals, and maintenance managers' opinions on this matter ranged from 0 miles to 1,000 miles.

We examined records of 610 inspections performed on 119 randomly selected buses for the year ending March 1982 and found that 45 percent of the inspections were late by at least 500 miles, 37 percent were late by at least 1,000 miles, and 24 percent were late by at least 2,000 miles. The Director, Office of Bus Service, was concerned about deferred maintenance and data indicating that the reliability of buses had generally declined over the past 4 years. For example, the average mileage between vehicle failure has decreased from 3,167 miles in 1978 to 1,795 miles in 1981. WMATA officials attributed most of the maintenance problems to a lack of mechanics, although they were also concerned about mechanic training and inadequate maintenance facilities. WMATA intends to initiate a study of maintenance problems in its system.

Massachusetts Bay Transportation Authority (MBTA)

MBTA's bus fleet consists of about 1,140 vehicles. Its preventive maintenance program requires inspections every 2,000 miles, alternating between primarily safety inspections and mechanical inspections. The purposes of the two types of inspections overlap to some extent. We examined computer-generated records of 541 inspections for 155 randomly selected buses during a 1-year period ending March 1982 and found that very few were performed within 500 miles of schedule. Eighty-five percent were late by at least 500 miles, 78 percent by at least 1,000 miles, and 62 percent by at least 2,000 miles.

MBTA maintenance officials stated that a lack of funds to hire mechanics was the primary reason for deferred maintenance. An MBTA memorandum dated March 27, 1981, concerning the manpower problem stated, "Preventive Maintenance which has been decreasing due to already existing manpower shortages at certain garage locations, will cease entirely, giving way to resumption of breakdown maintenance practices. This deferred maintenance will quickly consume any initial surplus vehicle availability and soon we will be struggling to meet our daily service requirements."

Metropolitan Transit Authority
of Harris County (Houston METRO)

Houston METRO has a fleet of 914 buses and requires maintenance inspections every 6,000 miles in addition to more routine daily and weekly inspections. Historically, Houston has had problems adhering to its maintenance schedule and transit performance has suffered. In 1979 the Houston city controller reported that the average number of miles between inspections was 11,480--almost twice what it should be. In July 1982 DOT's Inspector General's Office reported few improvements. According to the 1982 report, the average preventive maintenance inspection occurred at 11,513 miles during an 11-month period ending November 30, 1981. Further, vehicle performance remained a problem with an average of only 442 miles between vehicle failures.

During our visit to Houston in July 1982, we were informed that a new preventive maintenance program had been implemented in January 1982. Although it was too early to evaluate the adequacy of this program, we did note some indications of improvements. In a limited check of 158 buses at one maintenance center in July 1982, we found that only about 15 percent of the inspections were late. Further, METRO has reduced the number of buses that were unable to perform scheduled runs from 266 in September 1981 to 56 for the period November 1981 to June 1982.

Municipality of Metropolitan (METRO)
Seattle

Seattle METRO operates a fleet of about 1,100 buses. It has two preventive maintenance programs--one for standard buses and another for articulated buses (high seating capacity buses that have flexible bodies to accommodate their length). For the standard buses, the program requires six different inspections at 1,000-mile intervals of which five are mechanical inspections and one is a safety inspection. The safety inspection is performed at every other inspection. Articulated buses are scheduled for inspection every 2,000 miles with no special safety inspection, as METRO officials feel that articulated bus brakes are generally better than those on standard buses.

METRO uses a formal management by objective approach to evaluate maintenance that includes 16 objectives such as maintaining inspection intervals, limiting the number of buses out of service, and increasing miles traveled between roadcalls. The inspection interval objective requires that maintenance be performed within 200 miles of the schedule. We reviewed about 6,300 inspections performed on 196 randomly selected buses for a 1-year period ending March 1982 and found that METRO generally meets this objective. Eighty-six percent of the inspections fell within 200 miles of their scheduled time, and 98 percent were less than 500 miles late.

Other indications of maintenance problems

Past indications of maintenance problems have come from a variety of sources. In a February 26, 1981, report entitled "Soaring Transit Subsidies Must Be Controlled" (CED-81-28), we stated that transit systems are experiencing serious problems in maintaining bus and railcar fleets. The report identified a number of problems, including mechanics not being properly recruited and trained, inadequate preventive maintenance programs, and restrictive work rules that prevent maintenance personnel from being used efficiently. The report stated that transit systems should emphasize maintenance to better control rising transit operating costs.

DOT's Inspector General has also expressed concern over maintenance. A July 9, 1981, Inspector General's report on a large transit system noted that the system had at one time discontinued its preventive maintenance program which resulted in deterioration of its fleet; 29 buses purchased with Federal funds were taken out of service after 9 years when their expected life was about 15 years.

In May 1982 the Subcommittee on Investigations and Oversight, House Committee on Public Works and Transportation, summarized its concerns over maintenance, stating, "Those close to public transportation have long been concerned about the tendency by transit systems to defer maintenance to 'get by' from one budget cycle to another or one financial crisis to another. There is usually no immediate, visible impact from trimming maintenance expenditures. The chickens usually come home to roost at some later date, when a new cast of characters may be in place."

In addition to past reports of maintenance problems, transit performance data indicates that bus reliability appears to be deteriorating in many systems. UMTA's section 15 reporting system is designed to collect a wide variety of uniform performance and financial data from all transit systems receiving section 5 grants. Two reports under this system show that about 60 percent of the transit systems with 100 or more buses experienced a decrease in the average number of miles between vehicle roadcalls between the years ending June 1979 and June 1980. The

average number of miles between roadcalls for systems whose performance decreased dropped from about 4,062 miles to 2,704 miles, or about 33 percent.[2]

To obtain a trend on vehicle performance for the past 3 years, we telephoned 40 of the 60 largest transit systems. Of the 38 systems that had statistics on average number of miles between roadcalls, about 45 percent indicated that performance over the past 3 years had increased, 42 percent indicated that it had decreased, and 13 percent indicated that it had not significantly changed. Many officials cited sound preventive maintenance programs as a reason for increased performance. Increasing fleet age, more sophisticated buses, poor maintenance, and problems with mechanics were among the factors cited by officials for decreased performance.

OBSTACLES TO EFFECTIVE MAINTENANCE PROGRAMS

Most transit officials agree that maintenance is an important factor in achieving maximum vehicle performance and life--benefits that provide incentives to transit operators wishing to provide safe and reliable service. Despite these incentives, transit operators face obstacles to performing maintenance, including a lack of mechanics, inadequately trained mechanics, and more sophisticated vehicles that require more maintenance. Some researchers believe that the Federal grant program has compounded local transit operational problems by encouraging systems to expand beyond their local operating support capabilities and by making vehicle replacement an acceptable alternative to vehicle maintenance.

The American Public Transit Association, in commenting on UMTA's proposed maintenance regulations, summarized some of the problems facing the transit industry. After pointing out that no transit operator would deliberately neglect care of vehicles and facilities, it stated, "* * * many transit systems are facing budget shortages, lack of qualified maintenance personnel, and federally-mandated designed vehicles requiring high levels of maintenance purchased through strict low-bid and third-party contracting procedures, all of which are beyond the control of the operator."

To further examine some of the problems faced by the transit operators, we asked 40 transit authorities to what extent certain types of problems inhibited timely preventive maintenance in their systems. Limited mechanic training appeared to be the biggest obstacle followed by management information system limitations, problems with facilities, and a limited number of mechanics. The following chart identifies the potential

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[2]We did not verify the accuracy of the data collected by the section 15 reporting system.

obstacle and the extent to which each of the respondents believed it to be a problem.

Potential obstacle	Significance of obstacle: very great 1	2	3	4	little or none 5
Limited facilities	8	4	12	7	9
Limited number of mechanics	5	5	11	8	11
Limited spare parts	3	3	13	11	10
Limited mechanic training	6	12	7	11	4
Labor practices	2	5	12	10	11
Limited management information system	3	11	7	10	9

Other obstacles mentioned included adverse weather, absenteeism, and more sophisticated vehicles.

Many of the concerns expressed by the local transit officials appear to be related to limited resources. Some researchers believe that Federal assistance had contributed to these problems through encouraging capital expansion beyond local operating support capabilities. This reasoning is based in part on the fact that a system receiving grant assistance has paid only 20 percent of the cost of new capital equipment. This relatively small cost could allow transit systems to replace poorly maintained buses more frequently and promote the expansion of fleets beyond the systems' ability to support them. A 1979 Congressional Research Service report summarized the problem stating, "National policy toward investment in public transit and highways has systematically encouraged state and local governments to spend far more on capital-intensive construction and equipment purchases than they could otherwise have considered. By giving less attention to the operating and maintenance costs which must later be borne in order to keep up those systems, national policy has thus enticed local and State governments into the building of systems having operating costs which have later become heavy financial burdens."

CONCLUSIONS

UMTA historically has played a minor role in assuring that buses purchased with Federal assistance are being adequately maintained. UMTA's grant administration procedures for bus purchases have lacked adequately defined maintenance requirements and mechanisms for oversight. As a result, UMTA has little assurance that vehicles are being maintained and that the substantial Federal investment is adequately protected.

Although there is little information on the scope and severity of maintenance problems nationwide, several large transit systems have problems. Our review, which focused on preventive maintenance activities, indicated that some systems

were falling far short of their own maintenance schedules. Failing to perform adequate preventive maintenance can detract from a vehicle's performance and expected life. DOT's Inspector General's report identified serious maintenance deficiencies in one transit system that resulted in the early retirement of 29 buses purchased with Federal assistance.

More Federal emphasis needs to be placed on maintenance activities to better assure that the Federal investment in transit buses is adequately protected. The Federal Public Transportation Act of 1982 will require grantees receiving block grants to certify that maintenance activities will be implemented and will require the certification to be independently audited. Because the law was only recently enacted and implementing regulations had not been developed as of January 1983, it is too early to evaluate its impact on maintenance activities. However, we believe this approach should improve maintenance oversight for block grants.

In addition to establishing a block grant program, the new legislation continues to provide capital assistance under other grant programs. While not specifically calling for certification or independent audit, section 3 of the act, a major source of capital assistance, requires the Secretary to determine that a transit system has or will have the capability to maintain facilities and equipment. GAO believes that an oversight mechanism similar to the block grant approach could also be used for capital grant assistance.

Before the maintenance certification requirement can be implemented, UMTA must develop a maintenance policy that more clearly establishes guidelines for acceptable maintenance programs and criteria for evaluating how well the programs are implemented. Without such a policy, it would be difficult to interpret what the certification means. Unfortunately, a detailed maintenance policy is not easy to develop because local variables such as terrain and climate can affect the appropriateness of maintenance practices. Therefore, a Federal maintenance policy would have to be written with flexible guidelines. The American Public Transit Association has recently developed guidelines that discuss basic components of maintenance programs such as preventive maintenance schedules, quality assurance, and recordkeeping. UMTA could use these guidelines in developing a policy on appropriate maintenance activities. Additionally, UMTA needs to develop criteria to use in evaluating maintenance programs. We believe that initially the criteria should include whether or not a transit system's program has the basic components of an adequate maintenance program and how close to schedule preventive maintenance activities are performed. It is expected that criteria for maintenance program evaluation would evolve as the transit industry and UMTA become more experienced.

Transit maintenance officials identified a number of obstacles that inhibit maintenance, including a lack of mechanics,

limited training, and more sophisticated vehicles. Many of the obstacles appear closely tied to resource availability and could become more severe if local budgets tighten. While the new block grants will continue to provide a source of Federal assistance for maintenance activities, it is too early to evaluate how transit systems will use the funds and to what extent the funds will affect apparent local resource constraints.

RECOMMENDATIONS TO THE SECRETARY OF TRANSPORTATION

To provide a foundation for more effective maintenance oversight, we recommend that the Secretary direct the Administrator of UMTA to work with the transit industry and develop a Federal bus maintenance policy with flexible guidelines on what constitutes an adequate maintenance program and criteria to evaluate these programs.

We also recommend that the Secretary direct the Administrator to require that Federal capital grant assistance for bus purchases be subject to maintenance certification and independent audit provisions similar to those required for block grants. The amount of future Federal grant assistance should be dependent on correction of maintenance program deficiencies.

AGENCY COMMENTS

DOT agreed that UMTA lacked maintenance guidance and oversight mechanisms. (See app. II.) It indicated that it is developing a policy on maintenance that is compatible with the American Public Transit Association guidelines. It stated that the new certification and independent audit requirements contained in the Federal Public Transportation Act of 1982 should increase maintenance oversight. Additionally, DOT stated that it will perform a full review of the grantee at least once every 3 years.

DOT was reviewing our draft report at the time the Federal Public Transportation Act of 1982 was enacted. The legislation did not affect the draft report's proposal on the need for a maintenance policy. However, the legislation did affect what was originally our second proposal. This proposal basically endorsed pending legislation and would have directed UMTA to require (1) annual maintenance certifications as a condition of grant approval and (2) that the certifications be independently audited or spot checked by UMTA as resources permitted. The recent legislation contained similar oversight provisions for block grant recipients. We therefore modified our earlier proposal. Our final recommendation is aimed at assuring that a transit authority receiving capital grant assistance would also be subject to certification and independent audit provisions.

Agency officials stated that their plans for implementing block grant oversight procedures would also cover capital grants.

INDUSTRY COMMENTS

American Public Transit Association officials reviewed portions of the draft report. They pointed out that rigid Federal maintenance regulations should be avoided and that Federal operating assistance is essential to support maintenance. (See app. III.) They also emphasized that the main problem with maintenance was local resource constraints. Additionally, they noted that, in their opinion, problems in maintaining more sophisticated buses were a result of unneeded Federal regulation (such as wheelchair lifts and anti-wheel-lock air brakes).

We received comments from five of the six transit systems reviewed. A summary of their comments follows:

--The Washington Metropolitan Area Transit Authority stated that generally the draft accurately evaluated its transit system. It noted that since our review it had, among other things, established a new quality assurance function and tightened preventive maintenance standards. It believed that adherence to schedules has improved and reliability has increased.

--The Metropolitan Transit Authority of Harris County generally agreed with the sections of the report pertaining to its system. It stated that performance was continuing to improve largely as a result of aggressive preventive maintenance.

--The Southern California Rapid Transit District stated that evaluating a transit system's maintenance program by examining adherence to inspection intervals is only one indicator of maintenance program performance. It believed that the key to preventive maintenance is the quality of the repair phase. Our review's scope did not specifically cover the quality of the repair phase, which we agree is important. However, before this phase can take place, a problem must first be identified through systematic inspections.

--The Southeastern Pennsylvania Transportation Authority agreed that supervisors and foremen place inadequate emphasis on deferred maintenance because they believe that meeting route schedules is a higher priority. It stated that its vehicle information system was inaccurate and that using it to sample inspection intervals would likely result in a large number of errors. It indicated that it is exploring ways to develop or purchase a simpler and more dependable system.

As we stated on page 3, we did not validate the accuracy of the transit system's information system. However, in addition to reviewing computer generated maintenance records, we examined manual records maintained at SEPTA garage facilities which indicated that about 16 percent of the scheduled inspections were missed entirely. The manual records did not contain the necessary information to determine how closely, in terms of mileage, the preventive maintenance schedule was adhered to.

--The Massachusetts Bay Transportation Authority stated that it is aware of the importance of preventive maintenance and shares our concerns when budgeting restrictions result in deferred maintenance. It pointed out a number of actions it has taken, including hiring additional mechanics and establishing performance objectives.

APPENDIX I

LISTING OF TRANSIT SYSTEMS CONTACTED IN THIS SURVEY

Alameda Contra-Costa Transit District
Oakland, Calif.

Bi-State Development Agency
St. Louis, Mo.

Capital District Transportation Authority
Albany, N.Y.

Central Ohio Transit Authority
Columbus, Ohio

Chicago Transit Authority
Chicago, Ill.

Connecticut Transit
Hartford, Conn.

Dallas Transit System
Dallas, Tex.

Greater Cleveland Regional Transit Authority
Cleveland, Ohio

Greater Richmond Transit Company
Richmond, Va.

Honolulu Department of Transportation Services
Honolulu, Hawaii

Indianapolis Public Transportation Corporation
Indianapolis, Ind.

Kansas City Area Transit Authority
Kansas City, Mo.

Madison Metro
Madison, Wis.

Mass Transit Administration of Maryland
Baltimore, Md.

Memphis Area Transit Authority
Memphis, Tenn.

Metropolitan Atlanta Rapid Transit Authority
Atlanta, Ga.

Metropolitan Dade County Transportation Administration
Miami, Fla.

Metropolitan Suburban Bus Authority
East Meadow, N.Y.

Metropolitan Transit Commission
St. Paul, Minn.

Milwaukee County Transit System
Milwaukee, Wis.

New Orleans Public Service, Inc.
New Orleans, La.

New York City Transit Authority:
- Manhattan & Bronx Surface Transit
- Metropolitan Transit Authority

New York, N.Y.

Niagara Frontier Transportation Authority
Buffalo, N.Y.

Orange County Transit District
Garden Grove, Calif.

Phoenix Transit System
Phoenix, Ariz.

APPENDIX I

Port Authority of Allegheny County
Pittsburgh, Pa.

Queens Transit Corporation
Queens, N.Y.

Regional Transportation District
Denver, Colo.

Rhode Island Public Transit Authority
Providence, R.I.

Rochester-Genesee Regional Transportation Authority
Rochester, N.Y.

San Diego Transit Corporation
San Diego, Calif.

San Francisco Municipal Railway
San Francisco, Calif.

San Mateo County Transit District
San Mateo, Calif.

Santa Clara County Transportation Agency
San Jose, Calif.

Southwest Ohio Regional Transit Authority
Cincinnati, Ohio

Transit Authority of River City
Louisville, Ky.

Transport of New Jersey
Maplewood, N.J.

Tri-County Metropolitan Transportation District of Oregon
Portland, Oreg.

Utah Transit Authority
Salt Lake City, Utah

VIA Metropolitan Transit
San Antonio, Tex.

APPENDIX II

U.S. Department of Transportation

Assistant Secretary
for Administration

400 Seventh St., S.W.
Washington, D.C. 20590

JAN 28 1983

Mr. J. Dexter Peach
Director, Resources, Community,
and Economic Development Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Peach:

We have enclosed two copies of the Department of Transportation's (DOT) reply to the General Accounting Office (GAO) draft report, "DOT Needs Better Assurance That Transit Buses Are Maintained," dated December 23, 1982.

We agree that the Urban Mass Transportation Administration (UMTA) lacked maintenance guidance and oversight mechanisms. However, this condition will be corrected with the publication of UMTA's policy on maintenance of equipment and facilities and the administration of the new legislation passed on December 23, 1982, and enacted on January 6, 1983.

This legislation provides as a condition for grant approval a certification that the equipment will be adequately maintained and that the certifications be independently audited.

If we can further assist you, please let us know.

Sincerely,

Robert L. Fairman

Enclosures

APPENDIX II

DEPARTMENT OF TRANSPORTATION (DOT) REPLY TO A DRAFT OF A PROPOSED REPORT OF DECEMBER, 1982 ENTITLED "DOT NEEDS BETTER ASSURANCE THAT TRANSIT BUSES ARE MAINTAINED"

SUMMARY OF GAO FINDINGS AND RECOMMENDATIONS

The Urban Mass Transportation Administration (UMTA) has spent through fiscal year 1981, $5.5 billion to assist local transit authorities in purchasing about 49,000 buses in addition to related equipment and facilities. Maintenance is a key factor in determining whether or not transit buses perform reliably and achieve their maximum useful life. However, UMTA lacks assurance that proper maintenance is performed and consequently it has no assurance that the Federal transit investment is adequately protected.

GAO found the following:

- UMTA lacks adequate maintenance guidance and oversight mechanisms.

- Preventive maintenance activities are not performed in a timely manner by transit authorities, reducing the life and reliability of the equipment.

- Obstacles to improved maintenance, identified as inadequate mechanic training, lack of qualified mechanics, inadequate maintenance facilities and more sophisticated vehicles requiring increased maintenance efforts could become more severe as operating assistance is phased out.

GAO recommends that UMTA:

- Work with the transit industry to develop a Federal maintenance policy.

- Require as a condition of grant approval that transit systems certify annually that maintenance is performed in accordance with the accepted policy.

- If appropriate audit provisions are not included in new legislation, UMTA perform maintenance spot checks among the systems. The systems should be given the opportunity to correct deficiences before they are penalized.

SUMMARY OF DOT's POSITION

We agree that UMTA lacked maintenance guidance and oversight mechanisms. However, this condition will be corrected with the publication of UMTA's policy on maintenance of equipment and facilities and the administration of the new legislation passed on December 23, 1982 and enacted on January 6, 1983.

This legislation provides as a condition for grant approval a certification that the equipment will be adequately maintained and that the certifications be independently audited.

POSITION STATEMENT

We generally agree with the report's statement that UMTA has not developed an overall maintenance guidance and oversight policy. However, these omissions will be corrected shortly. We have developed a general policy on maintenance of facilities and equipment that will be updated to reflect the new legislation and will then be published in the Federal Register and incorporated into the management of the UMTA programs. Also, recent legislation enacted January 6, 1983, establishes the requirement that grantees provide annual certifications that they are capable of maintaining facilities and equipment adequately. The legislation also requires that such certifications be independently audited.

We generally agree that cutting costs by reducing the level of preventive maintenance will limit the reliability and life expectancy of equipment. With reduced Federal operating subsidies, local operators are faced with the choice of reducing service or increasing local subsidy funding. Some operators, however, may be tempted to delay preventive maintenance in order to keep service and local subsidy levels constant. If an operator were to severely cut back on maintenance, this would be a violation of the certification to adequately maintain equipment that grantees must sign under the new legislation. UMTA would at that point require corrective action.

With respect to the recommendation that UMTA work with the transit industry to develop a Federal maintenance policy, it will be UMTA policy to require that grantees have a maintenance plan and the required facilities, financing, qualified personnel and equipment to implement the plan so that grants for equipment or facilities can be approved. Such a plan would, as a minimum, specify the goals and objectives of the maintenance program in terms of the acceptable level of vehicle life, frequency of road service, failure rate, ratio of maintenance labor to other labor, and

other pertinent factors. It should also address such basic management questions as the criteria and methodology the grantee will use in identifying which items need preventive maintenance service, how frequently should such service be implemented, and what spare parts should be stocked. The American Public Transit Association's general maintenance guidance developed in 1982 for voluntary industry use is compatible with and supports this policy.

The legislation enacted on January 6, 1983, requires as a condition for grant approval annual certifications that the grantees have the legal, financial and technical capacity to carry out the projects and have, or will have, satisfactory continuing control over the use of the facilities and equipment, and will maintain such facilities and equipment.

The legislation also provides that at least on an annual basis, UMTA will conduct or require the grantee to have independently conducted reviews and audits of the certifications.

In addition to the annual reviews and audits, UMTA will perform at least every three years full reviews and evaluations of the grantee's performance in carrying out the projects. UMTA could make adjustments to the annual grants based on the new findings. We believe that the new legislation enables UMTA to exercise bus maintenance oversight more effectively and that this will result in improved protection of the Federal investment in equipment and facilities.

APPENDIX III

American Public Transit Association

Joseph Alexander, *Chairman*
James H. Graebner, *President*
Harvel Williams, *Secretary-Treasurer*
David F. Girard-diCarlo, *Immediate Past Chairman*
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Jack R. Gilstrap
Executive Vice President

January 14, 1983

Mr. J. Dexter Peach
Director
Resources, Community, and Economic Development
Division
Room #4915
United States General Accounting Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Peach:

We thank you for the opportunity to review and comment on the GAO Draft Report on transit bus maintenance. We know this will contribute to its completeness and accuracy. The APTA comments are enclosed.

In discussing transit bus maintenance, there are several general points that should be kept in mind.

1. Rigid federal regulations on maintenance are impractical and should be avoided. The transit industry has developed flexible bus maintenance practices, such as the APTA Guidelines for Bus Maintenance.

2. Federal operating assistance is essential to support maintenance.

3. The best use of federal resources should be to overcome the obstacles of effective maintenance. This can be provided by support of research and development, training, facilities, and equipment.

I am enclosing two copies of the newly published APTA Guidelines for Bus Maintenance referred to in the report. I hope that we can participate in any further GAO work in this or other areas.

Sincerely,

Jack R. Gilstrap

JRG/FJC:ssh

Enclosures

cc: Robert M. Coultas

1225 Connecticut Avenue, N.W., Washington, D.C. 20036 Phone (202) 828-2800

APPENDIX III

Comments of the American Public Transit Association
on the
GAO Report on Transit Bus Maintenance

Note: The following comments are keyed to margin numbers on the indicated draft page numbers. [See GAO note 1 below.]

1. (p. i, par. 4) "decrease" should be "increase."

2. (p.) "improper" implies that a wrong action took place, i.e., the wrong oil was added to the engine. A better word is "inadequate." Your report does not show that such wrong actions took place. [See GAO note 2 below.]

3. (p. ii, par. 2) Same comment as no. 2.

4. (p. 3, par. 3) You contacted two bus manufacturers, not three. APTA does not manufacture buses.

   The correct title for General Motors is GMC Truck and Bus Group.

5. (p. 5, par. 4) The guidelines now use 6,000 and 42,000 miles for these maintenance functions.

6. (p. 7, par. 4) The arbitrary 1,000 mile interval should be put in perspective in relation to the specified interval. For example, 1,000 mile interval is ± 8.3 percent of a 6,000 mile maintenance interval or ± 1.19 percent of a 42,000 mile maintenance interval.

   As you correctly discuss later, the precise effects of early or late maintenance are difficult to quantify.

7. (p. 8, par. 3) It should be stated that the majority of inspections (75 percent) were "on time" rather than emphasize the minority (25 percent) that were late. This comment applies to the remaining transit system discussions.

   It should be noted that many transit systems operate buses 200 - 300 miles per day. Thus, 500 miles (SCRTD criteria) is equal to 2 - 3 days. This is a small "window" of time in a seven-day week operation.

8. (p. 9, par. 2) I am not sure of the interpretation of SEPTA personnel or the GAO author, but in transit service, the highest priority and primary purpose is providing transportation to the system passengers by providing a safe operator and a bus on the street. All other considerations are secondary!

9. (p. 12, par. 3) It should be noted that in most instances, the "more sophisticated" vehicles are the result of unneeded federal regulation, i.e., wheelchair lifts for the handicapped, anti-wheel lock air brakes, useful only for trucks, air and noise emission equipment, roof escape hatches, and window release mechanisms which have no use.

10. (p. 15, par. 1) This is the main problem!

GAO note 1: Page references have been changed to correspond to the final report.

2: As a result of editorial changes, this material was deleted from the final report.

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