

***State of New York  
Office of the State Comptroller  
Division of Management Audit  
and State Financial Services***

**METROPOLITAN TRANSPORTATION  
AUTHORITY NEW YORK CITY  
TRANSIT**

**MONITORING VENDOR  
PERFORMANCE TO ENSURE THE  
AVAILABILITY OF SUBWAY  
AND BUS PARTS**

**REPORT 96-S-38**



***H. Carl McCall***  
*Comptroller*



# State of New York Office of the State Comptroller

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## **Division of Management Audit and State Financial Services**

### **Report 96-S-38**

Mr. E. Virgil Conway  
Chairman  
Metropolitan Transportation Authority  
345 Madison Ave  
New York, NY 10017

Dear Mr. Conway:

The following is our report on New York City Transit: Monitoring Vendor Performance to Ensure the Availability of Subway and Bus Parts.

We did this audit according to the State Comptroller's authority as set forth in Article X, Section 5, of the State Constitution. We list major contributors to this report in Appendix A.

*Office of the State Comptroller  
Division of Management Audit  
and State Financial Services*

June 3, 1998

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# Executive Summary

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## Metropolitan Transportation Authority

### New York City Transit

# Monitoring Vendor Performance To Ensure The Availability Of Subway And Bus Parts

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## Scope of Audit

New York City Transit (Transit), an affiliate of the Metropolitan Transportation Authority, is the largest transit system in the world. To achieve its mission - to provide safe, convenient, comfortable, reliable, and affordable mass transportation - Transit must equip its train barns and bus depots with the parts and materials necessary to maintain the system's fleet of approximately 5,800 subway cars and 3,400 buses in a safe and sound operating condition. In fact, Transit officials ordered about \$90 million worth of subway car and bus parts for calendar year 1995 alone. A prior State Comptroller's audit (Report 93-S-32, issued January 9, 1995) found that inventory levels for a number of parts were insufficient to meet service needs. As a result, parts were unavailable when needed. Subway cars and buses were either kept out of service or returned to service unrepaired. Our current audit found that the condition found in the prior audit related to buses continues to exist. We identified poor vendor performance regarding their ability to meet agreed-upon delivery dates as a contributing factor to this problem.

This audit covers the period January 1, 1994 through November 30, 1996, and addresses the following questions about Transit's monitoring of vendor performance relating to the delivery of parts:

- Do Transit officials monitor vendor performance adequately to ensure that parts are delivered by their agreed upon due dates?
- Do late deliveries of parts have a negative impact on Transit's ability to provide safe and reliable public transportation?

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## Audit Observations and Conclusions

Our audit found that many parts ordered by Transit officials are delivered by vendors after the agreed-upon delivery dates. For the 12-month period ended April 30, 1996, 862 of Transit's 1,340 vendors delivered their goods after the agreed-upon delivery dates, at least 30 percent of the time. Further, the system which Transit officials use to rate vendor performance regarding the on-time delivery of parts needs to be enhanced and better utilized. For example, vendors that are consistently one day late are categorized as poorer performers than vendors who are late less often, but for longer periods of time in each instance. However, it is possible that

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vendors in the latter category have a greater negative impact on Transit operations. We also found that all of the data available in Transit's vendor rating system, designed specifically to aid Transit officials in determining whether additional orders should be placed with particular vendors, was often not being used by Transit's procurement or other user divisions. We recommended that Transit enhance its rating system and take steps to ensure that it is properly used. (See pp. 3-9)

Our review of 10 sampled subway cars, removed from service due to defective parts, found that none had been returned to service without the necessary maintenance, or with safety-related defects. Also, despite the numerous subway cars removed from service each day due to defective parts, subway service disruptions were minimized due to Transit's significant subway reserve fleet. However, from a sample of 24 accident reports selected from the Safety Division's files we identified five instances where surface transit maintenance employees had been aware of a defective part, yet returned buses to service unrepaired due to unavailable parts. In three of these cases, the defective part was noted as having contributed to a subsequent accident. We also found that unavailable bus parts appear to be the cause of reduced surface transit service levels. However, due to insufficient records, we were unable to determine whether the unavailable parts in all of these instances were the result of late vendor deliveries or inadequate inventory forecasting or some other factors. In addition, it appears that many of the needed parts were actually available in stock but were not accessed by Transit staff. We recommended that Transit officials improve their inventory forecasting procedures and staff use of inventory reports to obtain parts needed for repairs, which in turn can reduce the number of buses and subway cars being removed from service each day. (See pp. 11-18)

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## **Response of Transit Officials**

Transit officials disagree with several of our report conclusions, and question their applicability to the audit scope. They also believe that the draft report does not present a balanced appraisal of recent programs that have been implemented to improve vendor performance. We have addressed each of their comments in the report.

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<b>Appendix A</b>	Major Contributors to this Report
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# Introduction

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## Background

New York City Transit (Transit), an affiliate of the Metropolitan Transportation Authority (MTA), is the largest transit system in the world. It moves more than 5 million riders on an average weekday over 716 miles of subway track and over more than 1,000 miles of bus routes. Transit's written mission is to achieve excellence in providing safe, convenient, comfortable, reliable, and affordable mass transportation. To help achieve its mission, Transit's train barns and bus depots must have the necessary parts and materials at their disposal to maintain its fleet of approximately 5,800 subway cars and 3,400 buses. In fact, Transit purchased about \$90 million worth of subway and bus parts during calendar year 1995 alone.

According to Transit policy, the Department of Subways' Material Management Unit and its various bus depots forecast their needs for parts to Transit's Materiel Division (Materiel). Materiel's Procurement Subdivision (Procurement), with the help of Transit's Vendor Relations Section (Vendor Relations), which provides information to assist in the vendor selection process, then selects the appropriate vendors. Vendor Relations is also responsible for monitoring and improving vendor performance.

The receipt, distribution, and storage of most parts are a function of Transit's Distribution Division. Parts are usually delivered to Transit's central warehouse located in Maspeth, Queens, for distribution to Transit's four main storehouses and various storerooms, depots and yards located throughout the system. Some parts, due to their size or nature, are delivered directly to the user areas.

Our prior audit (Report 93-S-32, issued January 9, 1995) found that inventory levels for a number of subway and bus parts were insufficient to meet service needs. As a result, subway cars and buses were removed from service until the necessary parts were received, or were returned to service unrepaired. We found that the conditions related to buses continues to exist, and that, at times, the inventory shortages are due to late deliveries of parts by vendors.

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## Audit Scope, Objectives and Methodology

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We audited New York City Transit's monitoring of vendor performance regarding the delivery of subway and bus parts for the period January 1, 1994 to November 30, 1996. Our objectives were to determine whether Transit officials had made an adequate effort to reduce the number of times that critical parts for subway cars and buses are delivered late. We

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also sought to determine whether the lack of needed parts had an adverse impact on subway and bus service and safety. To accomplish our objectives, we reviewed Transit's policies and procedures for vendor selection and monitoring of vendor performance, visited selected bus depots and train yards, and interviewed Transit officials. We also reviewed purchase and delivery documents, shop control logs, Peak Service reports, and other relevant data.

We did our audit according to generally accepted government auditing standards. Such standards require that we plan and do our audits to adequately assess those operations which are included in our audit scope. Further, these standards require that we understand Transit's internal control structure and its compliance with those laws, rules and regulations, that are relevant to the operations which are included in our audit scope. An audit includes examining, on a test basis, evidence supporting transactions recorded in the accounting and operating records, and applying such other auditing procedures as we consider necessary in the circumstances. An audit also includes assessing the estimates, judgments and decisions made by management. We believe that our audit provides a reasonable basis for our findings, conclusions and recommendations.

We use a risk-based approach when selecting activities to be audited. This approach focuses our audit efforts on operations identified through a preliminary survey as having the greatest probability for needing improvement. Consequently, by design, finite audit resources are used to identify where and how improvements can be made. Thus, we devote little audit effort to reviewing operations that may be relatively efficient or effective. As a result, our audit reports are prepared on an "exception basis." This report, therefore, highlights those areas needing improvement and does not address activities that may be functioning properly.

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## **Response of Transit Officials**

A draft copy of this report was provided to Transit officials for their review and comment. Their comments have been considered in preparing this final report and are attached in their entirety as Appendix B.

Within 90 days after the final release of this report, as required by Section 170 of the Executive Law, the Chairman of the Metropolitan Transportation Authority shall report to the Governor, the State Comptroller, and leaders of the Legislature and fiscal committees, advising what steps were taken to implement the recommendations contained herein and where recommendations were not implemented, the reasons therefor.

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# Monitoring Vendor Performance

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Transit officials recognize that, while price is a significant factor in vendor selection, they must also consider factors relating to vendor performance. Transit's policy requires potential vendors to demonstrate that they meet certain technical, experience, financial, ethical, quality, and timeliness standards. Collectively, these standards are referred to as "vendor responsibility." Vendor Relations is required to provide Procurement and user departments with information in each of these categories to help them determine whether the vendor is, in fact, "responsible" to receive an award.

Transit's standard purchase contracts refer to the need for timely delivery and include the following clause: "Time of delivery is of the essence of this Contract. In the event of a delay in the delivery of the Goods or Services, . . . the Authority may recover all damages for such delay, and may seek such other remedies, as are available under the Uniform Commercial Code or other laws of the State of New York." However, we note that Transit officials generally have not invoked this clause. Instead, Vendor Relations has been trying to work with noncompliant vendors to improve their performance. If vendor performance does not improve, the vendors are advised that they may be denied future contract awards or barred from Transit's vendor list for a period of up to three years.

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## Reliability and Application of Vendor Performance Data

Vendor Relations has developed a vendor rating system (Talon Vendor Performance Module or TVP) designed to systematically evaluate both Transit's best and worse-rated vendors in three categories: timeliness of delivery, quality/rejections and overshipments. TVP assigns a rating to vendors based on their on-time delivery history. A rating of "A" indicates successful performance in at least 93 percent of the vendor's deliveries, while a "D" rating indicates vendor compliance in only 69 percent or less of their deliveries and is considered unacceptable. These ratings are supposed to be used by Procurement and user departments when selecting potential vendors. However, despite TVP, poor vendor performance regarding timely deliveries continues to be a problem for Transit. For example, of the 1,340 vendors who delivered materials to Transit's storerooms between May 1995 and April 1996, 862 were given unacceptable "D" ratings.

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In response to our draft report, Transit officials indicate out that vendor delivery performance had improved over 35 percent during our audit period and more than 50 percent through July 1997. However, they acknowledge the need for further improvement in this area.

We also found what we believe to be a deficiency in the TVP rating system which may result in misleading ratings, because ratings are assigned to each vendor based on the number of their on-time deliveries expressed as a percentage of their total deliveries. Deliveries made one day past the contracted delivery date are considered late. Thus, the performance of vendors who are consistently one day late is rated lower than that of vendors who are late less often, but for longer periods of time in each instance. Since it is possible that vendors in the latter category may have a greater adverse impact on Transit's ability to deliver optimal service, it may not be prudent to assign ratings in this manner.

In response to our draft report, Transit officials state that TVP works exactly as designed and is used as a tool to indicate the frequency of prior late deliveries. They added that their procurement specialists are expected to consider both frequency and duration of prior late deliveries. However, they did not document how the "duration" factor is incorporated into the vendor-selection decision process.

We were also informed by Vendor Relations officials that when vendors deliver directly to user departments, those department representatives may not prepare the required receiving reports until vendors complain that they have not been paid. When these receiving reports are ultimately submitted, they may reflect the dates they were prepared instead of the dates the items were actually received. In such instances, vendor performance is assessed inaccurately.

Transit officials require Procurement staff to use the vendor performance information available from Vendor Relations when selecting vendors. Procurement staff must complete a Procurement Staff Summary illustrating vendor-related information for competitively bid contracts exceeding \$25,000. For purchases exceeding \$100,000, Procurement staff must also request Vendor Relations to complete a vendor responsibility checklist, documenting that they have checked other Transit vendor rating systems, such as "Vendeval." Vendeval contains evaluations of vendor performance by several Transit sources, including user departments and the Controller's Department.

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To determine whether Procurement staff were actually using the information available through Vendor Relations, we selected a sample of 80 deliveries made during the period June 1994 to April 1996 that were received anywhere from 1 day to 107 days after the due date. Transit's Rapid Transit, Surface, and Track divisions considered the parts included in these deliveries critical to the safe operation of the system's subway cars, buses, or tracks. The total cost of the items included in these deliveries was \$3.9 million.

We reviewed the bid folders for 11 of these 80 deliveries and found no evidence that Procurement staff had referred to the vendors' TVP rating in any of the cases. When following up on this issue, we found that Transit's procurement guidelines do not require staff to document their TVP reviews. Therefore, Transit officials have no way of knowing whether the required reviews are done.

In response to our draft report, Transit officials state that the TVP is checked for all procurement over \$100,000 and noted in the bid file. However, they will revise the procurement checklist to include an item that will document procurement staff reference to TVP. Despite Transit's response, the 11 bid folders we reviewed should have contained evidence that TVP was checked but they did not.

If Transit's vendor rating system is not reliable, or not used as intended, Procurement and user departments may select vendors with poor on-time delivery records, and conversely, reject vendors who, for the most part, comply with noted delivery dates. Transit's vendor performance tracking records indicate that the former does, in fact, occur.

Transit officials replied to our draft report that vendors with poor ratings may have received awards because of other factors such as price, and not as a result of the unreliability of its rating system.

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## **Promoting Improved Vendor Performance**

In our attempts to identify the reasons for the continued poor performance of Transit vendors, we found that there were no disincentives for vendors who do not comply with agreed-upon delivery dates. For example, many Transit contracts include a "breach clause." Such clauses allow Transit to obtain needed items from a different vendor if they are not delivered by the original vendor by the due date, and to charge the original vendor for any extra costs it may incur in doing so. However, in the 80 deliveries we sampled, Transit officials did not exercise this option.

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According to Transit officials, until a few years ago, they had included “liquidated damage” clauses in many of their purchase contracts. These clauses were also intended to improve future vendor performance. However, Vendor Relations informed us that the majority of these clauses were removed from contracts when, in September 1991, Transit officials adopted a Federal regulation precluding them from seeking damages against a vendor if the lost dollars could not be specifically quantified. According to Transit officials, it is often too difficult for them to calculate the effect of vendor lateness in specific dollars. Thus, the clauses were removed from all contracts except those where the loss could, in fact, be quantified.

More recently, Transit has implemented a pilot program called “100 Worst Vendors.” The program requires representatives of vendors with particularly poor performance ratings to meet with Transit staff to address performance concerns and to prepare, and comply with, a corrective action plan. Vendors whose performance does not improve within a designated timeframe may ultimately be suspended or removed from Transit’s vendor list. We commend the implementation of this program, as described.

We suggest that Transit consider other performance incentive steps as an alternative to liquidated damage clauses. Transit officials could study the merits of incorporating a “purchase discount” clause into their purchase contracts. For example, the State’s current prompt payment legislation requires State agencies to pay vendor invoices within 30 days of receipt to avoid vendor late payment charges. Applying this conversely, Transit, as part of the contract terms, would be entitled to an allowance i.e., “purchase discount,” if the vendor did not deliver procured items in accordance with the dates specified in the contract. Using the same interest rates in effect during the audit period that were chargeable to State agencies under prompt-payment legislation, at least \$18,000 could have been recovered from the vendors responsible for the 80 late deliveries sampled.

Transit officials were averse to this proposal. They expressed concern that vendors might inflate their initial bids if they thought the payments might be reduced later and, as with liquidated damaged clauses, when used too broadly, they become an administrative burden of questionable benefit. However, we believe that such a clause would encourage vendors to bid competitively and to make greater efforts to meet delivery terms, particularly if they wish to continue doing business with Transit. In turn,

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vendors that knowingly cannot meet Transit's delivery schedule would be discouraged from bidding.

In addition, in response to our draft report, Transit officials state that we are incorrect to conclude that there were no disincentives for vendors who do not comply with agreed upon delivery dates. They cite their pre-award vendor qualification hearing and "100 Worst Vendors" program as addressing that need. Although we believe that these existing programs are positive steps for Transit to take to improve vendor performance, Transit's continuous use of vendors who perform poorly is proof that these programs may not be enough to achieve the maximum desired result.

We also reviewed Vendor Relations' vendor files to confirm that they had, in fact, been communicating with poor-performing vendors regarding ways to improve their performance. We found several communications from vendors citing Transit's bureaucracy, and ambiguously-worded purchase order documents, as the reasons for some of their late deliveries. Our independent communications with nine other Transit vendors noted similar concerns. However, there was no evidence that Transit staff had followed up on these claims to assess their validity.

In response to our draft report, Transit officials offered their own interpretation of our findings regarding vendor comments on Transit performance. They state "...it is naive (for the auditors) to be surprised that a poor performing vendor might complain about Transit's bureaucracy...." They place the onus on vendors to inform them when they encounter problems.

To the contrary, we are not surprised at all by vendor comments. We merely state the facts identified as a result of our audit. We acknowledge that both Transit officials and the vendors have an obligation to ensure that they are fully aware of each other's responsibilities in the procurement process. It is therefore important that Transit officials recognize their own responsibility to work with vendors to address their concerns such as ambiguously worded purchase order documents.

After our fieldwork was completed, Vendor Relations officials told us that prior to our audit they had initiated an expanded system of automated notifications to poor-performing vendors where the severity of each notification depends on the extent of inadequate performance. Notices range from that of a simple notification of customer dissatisfaction to notification that the vendor is being dropped from Transit's vendor list and is precluded from receiving future awards for a specified period.

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## **Recommendations**

1. Enhance the TVP vendor rating system to measure vendor performance in a more meaningful, fair and useful manner.

(Transit officials disagreed with this recommendation on the basis that “TVP works exactly as designed” and they have other sources that Procurement Specialists are expected to use when making responsibility determinations. While we acknowledge Transit’s response that the TVP system works as designed, our recommendation addresses the need to make TVP more useful to the Procurement Specialist by adding information e.g., duration of prior late deliveries. This may increase the likelihood that both frequency and duration are considered if for no other reason than both are available in one place.)

2. Document staff use of the TVP rating system, as well as the reasons for decisions to award contracts to vendors who have been rated poorly.

(Transit officials partially agreed with this recommendation. They stated that the use of the TVP module will be documented in all cases over \$10,000. However, it will not be done for purchases under \$10,000 because it is not cost effective.)

3. Develop other performance incentive steps designed to improve vendor performance. As part of the process formally evaluate adding purchase discount clauses to purchase contracts.

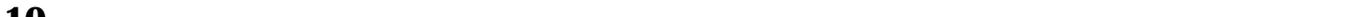
(Transit officials replied “After due consideration, we determined that using purchase discounts would not be practical or beneficial.” While we believe that Transit officials should formally re-evaluate the use of purchase discounts, they should minimally commit to exploring what other actions can be used to improve vendor performance.)

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### **Recommendations (continued)**

4. Follow up and address, as appropriate, vendor concerns regarding impediments to on-time deliveries (e.g., ambiguously worded purchase orders).
5. Periodically evaluate the effectiveness of the recently initiated automated vendor-notification program and revise as appropriate.

(Transit officials agreed with Recommendations 4 and 5 and indicated that they have taken appropriate action.)



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# Impact of Late Deliveries on Safety and Service

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To help maintain safe and reliable service, Transit must ensure that parts critical to the operation of subways and buses are always available to replace those which become defective. As such, vendor compliance with purchase order delivery dates is of vital importance, particularly when the items purchased are needed to replace/repair parts that may affect passenger safety and service. Yet, 21 of the 22 vendors we sampled who had provided critical parts during the audit period, such as brake and steering devices, had been given “D” (unacceptable) ratings for late deliveries.

Each bus depot maintains a shop control log showing the in-service status for each bus assigned thereto. Subway service yards maintain similar records for subway cars. We reviewed a sample of these logs, on two randomly selected dates, to determine the approximate number of buses and subway cars noted as needing replacement parts on those given days. According to the logs reviewed for June 25, 1996, a total of 180 buses (5 percent of Transit’s fleet) was noted as needing parts that were reportedly unavailable. More than 100 of these buses, referred to as “trippers,” i.e., remain in active service pending delivery of the needed parts. Just one week earlier, at least 116 subway cars (2 percent of Transit’s fleet) had been removed from service due to unavailable parts. The total number of subway cars actually affected by unavailable parts was much larger because cars needing maintenance are physically attached to cars that do not, and, they are both removed from service. Thus, idle equipment due to unavailable parts have a significant impact on the efficiency of Transit’s operation.

We sought to determine whether poor vendor performance was a major reason for parts not being available when needed. As detailed later on in this report, we conclude that poor vendor performance is one of several factors contributing to this condition. Other factors include inventory forecasting deficiencies, and inadequate communication between Transit’s maintenance staff and employees responsible for distributing parts.

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## Safety Issues

If accidents occur as a result of unsafe equipment, service is disrupted, repair costs are increased, and more important, people may be injured. In addition, there is a potential for costly litigation.

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## **Department of Buses**

The Department of Buses has adopted the following policy concerning safety-sensitive defective parts, such as defective steering, brakes, interlocks, and wheelchair restraint mechanisms, that can lead to loss of control, collision or onboard customer/pedestrian injury: “It is Department of Buses’ policy to identify, remove from service and properly repair all buses that have sustained a safety-sensitive defect.”

During our visits to four Transit depots, we noted that employees follow fairly consistent but unwritten procedures, where the supervisor of the midnight shift decides whether the affected bus should be removed from service. If the supervisor decides that it is safe to return a bus to service before replacing the defective part, it is listed on the depot’s daily log as a “tripper-no stock” (tripper), indicating that the bus is to be repaired when the necessary part becomes available.

Transit’s System Safety Division (Safety Division) is responsible for investigating, and determining the causes of accidents that occur throughout the system. The resulting investigation reports should be contained in the Safety Division’s case files. We selected our sample of 24 accident reports from the Safety Division, determined if the bus was a tripper and then looked for evidence that a part was a factor. We found three instances where investigators determined and documented that the respective depot maintenance personnel were aware of the defect prior to the accident.

We then sought to determine whether the buses in our sample were returned to service due to replacement parts being unavailable. However, the descriptions of the relevant parts noted in the investigation reports were not specific enough for us to obtain their inventory stock numbers and trace them to their respective maintenance records. Therefore, we were unable to make this determination.

We believe, as do Transit officials, that it is in Transit’s best interest to prevent as many accidents as possible. Accordingly, Transit officials should ensure that the records that are maintained clearly identify the specific causes of accidents, which, in turn, would allow them to institute preventive measures to minimize the contributing factors within their control.

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## Department of Subways

The Department of Subways does not have a written policy to guide repair barn employees in determining when to sideline subway cars needing maintenance or repairs when parts are not available. As a result, these situations are handled differently at each of the three subway barns we contacted. Although one barn official informed us that no car is returned to service without the needed repair or maintenance work, the remaining two stated that when a non-safety-related defect is discovered during the morning pre-rush-hour inspection, and there is no time to repair it before the car is needed, it is designated as BAS (Back After Service) and returned to service. However, there is no mechanism for specifically identifying, tracking, and reporting BAS cars.

To determine whether any subway cars were removed from service due to defective parts and returned to service without the necessary repair, we selected a sample of 10 cars returned to service just one day after each was removed. Subway cars returned to service within such a short timeframe are the ones most likely to be returned unrepaired. However, according to repair barn records, none had been returned without the necessary maintenance or with safety-related defects.

### Recommendations

6. Monitor compliance with the Department of Buses procedure regarding “Safety Sensitive Defects” to ensure that employees remove buses with safety-related defects from service and that the appropriate supervisory sign-offs are obtained on safety-sensitive repairs.
7. Implement a formal policy to govern the removal, from and subsequent return of, subway cars to services that were noted as having safety-related defects.

(Transit officials replied that it *has* (emphasis added by Transit) a standard operating procedure regarding removal of cars for preventative maintenance. However, this does not address the need for a policy regarding subway cars for other than scheduled preventative maintenance.)

8. Evaluate the causes of accidents to determine whether changes in policies and procedures can serve as preventive measures.

(Transit officials replied that they periodically review the causes of accidents and recommend corrective action.)

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## **Service Issues**

According to Transit officials, the Departments of Buses and Subways have each established optimum customer service levels to meet the needs of their passengers. The Departments have also established minimum levels of equipment and parts that each bus depot and subway yard should have in stock to maintain these optimum levels of service. We found that unavailable parts at selected bus depots have resulted in Transit's inability to meet its optimum levels of service.

### **Department of Buses**

The Department of Buses tracks the impact of bus shortages on its "Daily Lost Trips and Operated Percentages Report." For example, the June 13, 1996 report stated that, because some buses were unavailable, the system lost a total of 172 bus trips. (A bus trip is defined as a complete circuit from the bus' point of origin to its final destination.)

According to the depot shop control logs we examined for each of 5 sampled days during the audit period, anywhere from 9 to 12 of Transit's 19 bus depots did not meet their respective optimal service requirements on those days. On average, these depots had 76 fewer buses available per day than they needed to meet their predetermined optimum service levels. Thirty-one (41 percent) of the 76 buses were noted as out of service because necessary replacement parts were reportedly not available.

According to Department of Buses' officials, they attempt to minimize the impact of out-of-service buses by absorbing the shortages in routes that have the shortest intervals (least time) between passenger pickups. However, depot representatives informed us that despite these efforts, diminished service will nevertheless result in some passengers waiting longer periods of time to be picked up and often leads to a greater number of overcrowded buses. In some cases, bus routes are modified (e.g., eliminating several blocks from a scheduled bus route), making it necessary for customers to walk further to and from their designated bus stop. As a result of these inconveniences, Transit could lose revenue as customers turn to other means of transportation such as private vans, cars, etc. In addition, the effected bus drivers might remain unproductive when the working fleet is reduced.

Transit officials responded that the shop control logs are used internally by depot maintenance employees, and are not a true reflection of Transit's success in meeting service requirements. Instead, we were referred to the Weekday A.M. and P.M. Peak Service Reports (Peak Reports) produced by Transit's Central Bus Command Center. The Peak Reports showed

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that on these same five days, an average of six depots could not meet their service requirements because they had fewer than the minimum number of buses during the course of the morning rush hour. Transit officials told us that there are differences between the shop control log and the Peak Reports because the log may not reflect the fact that a bus was borrowed from another depot or that the Peak Report and the log are prepared different times of the day. While we understand that there can be differences between these two sources during the shift, it is not unreasonable to expect that these two documents have to be reconciled at some point to accurately determine whether the level of service requirements was met, and if not by what amount.

When reviewing the shop control logs, we noted that many of the parts listed as unavailable, such as hydraulic pumps and panel assemblies, related to the operation of bus wheelchair facilities. To determine the specific impact these unavailable parts had on service to the disabled, we contacted two organizations involved with handling issues related to persons with disabilities. Both sources told us that disabled passengers have complained to them that they are often forced to wait for long periods of time - sometimes up to three hours - for a bus that has functioning wheelchair facilities.

An official from Transit's Material Management Unit informed us that the major problem with wheelchair accommodations is unexpected breakdowns. However, when we analyzed 72 deliveries relating to these specific unavailable parts, we found that 27 (38 percent) of the deliveries occurred after the contracted due dates. These late deliveries contributed as much as 55 business days to the length of time some of these parts were unavailable. Thus, it appears that poor vendor performance is a contributing factor to these specific unavailable parts.

In response to our draft report, Transit officials assert that we do not properly indicate the materiality of the 172 lost bus trips, considering the total number of scheduled bus trips (over 43,000) for the sampled day.

We accept that given the magnitude of Transit's total scheduled bus trips on any given day that Transit officials may consider the percentage of lost trips as immaterial. However, the fact remains that 172 lost trips may affect hundreds, if not thousands, of riders to whom each and every bus trip is important. To the extent that these lost trips are the result of missing parts, Transit should make every effort to prevent them from occurring, rather than cite their statistical relevance.

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## Department of Subways

The Department of Subways' service yard records indicate that a minimum daily average of at least 121 subway cars were out of service during our sampled week. However, due to its significant reserve fleet, which is equivalent to approximately 15 percent of the total fleet, they were able to maintain close-to-optimum service throughout our sampled period.

We note that Transit spends about \$50,000 annually to maintain each reserve subway car or bus. Therefore, if it was able to reduce the number out-of-service buses and subway cars on a routine basis, Transit's reserve fleet could be downsized, and corresponding maintenance and operating costs would be reduced.

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## Analysis of Unavailable Parts

To further determine the extent of which unavailable parts affect Transit service, we selected an additional sample of 57 buses and subway cars reported as out of service due to defective parts. Our review included tracing back the needed items to stockroom inventory records, purchase orders and receiving reports.

As illustrated in the following table, we found that late deliveries by vendors were indeed a factor for some parts being unavailable, while other parts were unavailable due to apparent inventory forecasting deficiencies. Moreover, per Transit in-stock reports, in 19 cases the needed parts were, in fact, available but had not been accessed by depot/yard maintenance employees.

Category of Vehicles	Total Number of Unavailable Parts	Reasons for Unavailability		
		Late Delivery by Vendors	Item Not in Stock Due to Forecasting Deficiencies	Part Available But Not Accessed by Depot
Out-of-Service Subway Cars	26	9	8	9
Out-of-Service Buses	31	10	11	10
Totals	57	19	19	19

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For example:

- On May 14, 1996, a bus was taken out of service because it needed a rear door filler panel assembly and a left rear wheel panel assembly. The selected vendor was asked to provide the items by June 1, 1996, although he was not contractually obligated to do so until September 19, 1996. However, the vendor did not deliver the assembly door until November 1, 1996. The wheel assemblies were not done until November 21, 1996, 191 days after the bus was removed from service.
- On April 8, 1996, another bus was removed from service because it needed a solenoid front door engine valve. The bus remained idle for at least 23 days, even though inventory reports for this period indicated that Transit storerooms had several of these valves in stock.

Depot officials noted that Transit storerooms are not under their control but are operated by Transit's Distribution Department. Therefore, they do not have immediate access to parts in storage. They also claim that maintenance employees often have to track down materials throughout the system because it is difficult to obtain them from the Distribution Department. As such, they sometimes remove used parts from previously disabled buses for reinstallation in other vehicles.

Several depot officials also informed us that their staff had not received sufficient training to perform the forecasting function adequately. In fact, at least one depot representative was misrepresenting the reasons for several trippers by citing the need for hard to get parts, such as radiators, just to ensure that an adequate number of them were on hand at the depot.

Transit officials told us it would not be cost-effective for them to maintain their parts inventory at levels that would ensure stock outs will never occur. Thus, they are willing to accept the risk that a certain number of subways and buses will be out of service due to unavailable parts. While we understand that stock outs may occasionally occur, we believe that Transit can refine its forecasting system to minimize their frequency, and, as noted earlier, reduce the size of its reserve fleet.

In response to our preliminary findings, Transit officials advised us that they are in the process of installing an automated bus maintenance information system known as MIDAS (Maintenance Information, Diagnostic and Analysis System). MIDAS will be linked to TALON

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which will enhance Transit's material management and forecasting capabilities. The Department of Subways indicated that it was enhancing its training program and taking other steps to ensure material availability.

**Recommendations**

9. Take appropriate steps, including providing training, to improve inventory forecasting and interdepartmental staff communication.
10. Ensure that all bus wheelchair facilities are functioning properly, and work more closely with vendors who supply the related parts to expedite deliveries.
11. Study the feasibility and financial benefits of reducing Transit's reserve fleet once inventory operations are improved.

(Transit officials agreed with these recommendations and indicated that corrective actions have been taken.)

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# Major Contributors to This Report

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