



Montgomery County Government

MEMORANDUM

January 14, 1985

TO: County Council

FROM: Andrew Mansinne, Jr., Director, Office of Legislative Oversight

SUBJECT: Office of Legislative Oversight Report #84-3, A Description and Evaluation of the Department of Transportation Division of Equipment Management

Attached is a report by the Office of Legislative Oversight which evaluates the County government's equipment management program.

The summary and major conclusions and recommendations are on page 1 with detailed conclusions and recommendations beginning on page 47.

Before completing the report, a draft copy was sent to the Chief Administrative Officer, the Director of the Office of Management and Budget, and the Director of the Department of Transportation. The comments of those who responded are included in Section VII of the report, which begins on page 50.

This report is scheduled to come before the Council at the regular session on January 29, 1985, for action on the public release of the report.

AM:csb

Attachment

cc: Art Spengler, Council Staff Director

Approved for Release _____
(Councilmember)

Office of Legislative Oversight

100 Maryland Avenue, Rockville, Maryland 20850, 301/251-7990



Montgomery County Government

MONTGOMERY COUNTY COUNCIL
OFFICE OF LEGISLATIVE OVERSIGHT

REPORT #84-3

TITLE

A Description and Evaluation of the Department of Transportation
Division of Equipment Management.

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I. SUMMARY

1. Program Overview. The Division of Equipment Management is responsible for fully meeting the County's vehicle and equipment needs at the lowest possible cost. As manager of a fleet of approximately 2,000 vehicles and pieces of equipment, it provides a wide range of services that support the operations of probably every County government program. Among its biggest customers are the Police, Ride-On, and Highway Maintenance.

The division plans and manages the procurement of nearly all equipment in the County's fleet. It supplies the fuel, maintains and repairs the vehicles, tests for emissions, and refurbishes or disposes of aging and surplus equipment. It also provides emergency services as required.

With 168 authorized positions, a total budget exceeding \$13 million, two fully equipped maintenance shops, and an inventory of repair parts and fuels valued at \$870,000, the equipment management program is a major operation. The division's budget is almost totally funded by revenues received from equipment rental charges to user agencies, with only about ten percent attributable to other sources.

2. Major Findings. This evaluation finds overall that the DEM is a well managed organizational unit. It pursues sensible objectives appropriate for meeting County government needs at minimum cost. The County has benefitted from strengthened direct management oversight obtained by upgrading the equipment management function in 1980 to its current divisional status.

Current facilities are inadequate; however, an active program of expansion is underway, which should fulfill the DEM's needs by FY 1987. The breadth of personnel skills and capabilities is excellent, although there is an over emphasis on higher graded shop personnel and certain supervisory functions. The DEM could make better use of opportunities to employ apprentices and helpers and to provide structured career ladders. It also could take fuller advantage of existing opportunities to link compensation to performance.

The most deficient aspect of the DEM is its management information systems. The current patchwork of four completely separate systems handling vehicle records, inventory control, fuel dispensing, and financial accounting does not meet the management needs of a fleet the size of the County's. It results in low levels of flexibility in analyzing and using the information. Data is not available in a timely fashion. There is substantial duplication of efforts and the total cost appears comparable to what would be necessary to fund a state-of-the-art, integrated, on-line system. Failure to upgrade this system appears wholly attributable to bureaucratic battling and the unwillingness or inability of senior management to reach a decision on the most appropriate solution.

Despite these information problems, the overall DEM operation works. Procurement appears to function well, securing appropriate equipment and fuels in a timely fashion at competitive prices. Vehicles are generally maintained and repaired successfully.

The needs of high priority users, such as Police and Ride-On are generally met best. There are some problem areas, primarily affecting other fleet users, which include excessive vehicle downtime, scheduling delays and high rates of repair comebacks. Overall labor productivity is good but could be better. Communications with users need to be improved.

Financing is probably the DEM's biggest success story. In four years, it has eliminated a deficit of \$1.6 million and achieved a total surplus estimated at \$2.6 million. The DEM has updated and improved the rental rate structure so that equipment charges to agencies accurately reflect the costs to the County.

3. Recommendations. This report presents a series of recommendations for continuing and improving the operation of the DEM. It recommends no change to certain major features of the current system: equipment management goals and strategies, divisional status, planned facility expansion, procurement practices, and the rental rate financing system. Specific recommendations address areas of personnel management that should be changed to improve DEM performance. Other recommendations address needed enhancements in various operational aspects such as management information systems, preventive maintenance, shop scheduling, contracting out, the third shift arrangement, and user communications.

II. AUTHORITY, SCOPE, AND METHODOLOGY

1. Authority. Council Resolution 10-559, Subject: CY 1984 Work Program of the Office of Legislative Oversight, adopted January 31, 1984.

2. Scope. This study evaluates the effectiveness and efficiency of the Department of Transportation (DOT) in meeting the vehicle and equipment needs of Montgomery County Government. It encompasses all operational, organizational, and financial aspects of the DOT Division of Equipment Management (DEM).

3. Methodology. The evaluation was conducted during May - November 1984. It follows up on the cross-cutting budget reviews of vehicle maintenance conducted by the Office of Legislative Oversight (OLO) for FY 1984 and FY 1985 and on prior OLO reports: # 82-6 (A Critique of the Office of Management and Budget's Evaluation of the County Executive's 1979 Reorganization) and # 78-2 (An Evaluation of Policies and Procedures Concerning the Assignment of Administrative Vehicles Within the County Government).

The study methodology included interviews, field visits, and document reviews. Interviews were conducted with a wide range of individuals, including DEM personnel, user agency personnel, other County staff and contractors, public and private sector fleet managers, fleet consultants, and others. Field visits were made to existing and planned DEM repair facilities, and other area fleet locations. DEM made available extensive documentation for review, including internal management reports, special studies, computerized fleet and inventory records, correspondence,

purchasing and contracting documentation. Other County agencies also made significant information available concerning the utilization of and supporting services to the division.

At the conclusion of the study, preliminary findings were discussed informally with DOT and DEM management. A draft version of the report was circulated to the Executive branch for comment; responses are acknowledged at the end of the report.

III. BACKGROUND

1. Introduction. Equipment management is an essential supporting service of the Montgomery County Government. County programs could not operate without motor vehicles and other mobile equipment. Whatever the function performed, from facility management to law enforcement; whatever the service provided, from leaf collection to environmental protection; County agencies depend on the vehicle fleet to get their jobs done.

Equipment management is one of the County's major costs of operation. Motor Pool expenditures represent nearly one out of every seven dollars spent on the operating expenses of County government.* Equipment costs are an even more significant budget item for some activities. For example, approximately half of the total operating expenses for the DOT Highway Maintenance Section are budgeted for motor pool charges.

2. Program History. The equipment management program dates back to 1957-58, the first fiscal period in which specific charges for motor pool usage were assessed on individual departmental budgets. In 1961 it was established as a separate organizational unit, the Equipment Section of the DOT Division of Operations. As part of the implementation of the County Executive's 1979 Reorganization Plan, the equipment program was upgraded to its current divisional status in 1980.

3. Evaluation Objectives. The 1979 Plan identified two primary criteria for all reorganization moves: shifting resources to higher priority work; and improving the effectiveness, efficiency and responsiveness of County Government. Although that plan did not commit the County Executive to establishing the DEM (a decision that was made subsequently during the implementation phase), it specifically indicated that higher priority would be given to the equipment management program acting as a service agency to the County Government. This evaluation study, therefore, focuses on two broad issues that are derived from these criteria:

(a) Does the DEM adequately meet the vehicle and equipment needs of County Government programs?

* The total Motor Pool expenditures in the FY 1985 budget of \$14,534,810 equal 13.2% of the County government's operating expenditures (from all funds, but excluding personnel costs, debt service, capital outlay and WMATA subsidy), which total \$110,244,199 in the FY 1985 budget.

(b) Has the DEM held down the costs or otherwise improved the efficiency of County government operations?

IV. DESCRIPTION OF DIVISION OF EQUIPMENT MANAGEMENT

1. Roles and Missions. The DEM fundamentally operates in a support services role. Its mission is exclusively to provide services to other elements of County Government in support of their program activities. It has no other raison d'etre. All aspects of the division's performance must be understood in this context.

(a) Objectives. The overall goal of the DEM is to fully meet the vehicle and equipment needs of County Government at the minimum total cost. In practice, that means that the DEM sets as its objectives to: (1) acquire appropriate equipment to meet County needs, (2) acquire and dispense needed fuel, (3) maintain the fleet in running order, (4) meet emergency needs, and (5) do all of the above for a low price.

(b) Functions. There are a variety of functions that the DEM must perform to meet the above objectives. For example, it is deeply involved in the procurement process. The DEM reviews County needs and commercially available equipment to develop specifications for bid requests. It analyzes vendor bids and makes recommendations for the awarding of contracts. The division is similarly involved in the purchasing and supply of gasoline and other fuels, shop equipment, supplies, materials, and repair parts.

The DEM provides maintenance and repair services to keep the vehicles and equipment operating. These include scheduled (that is, preventive) and unscheduled maintenance. It does both mechanical and body work. The division runs several well-equipped shops to keep the County fleet on the street. It maintains a large inventory of repair parts on hand. It contracts out for services that cannot be performed in house.

The division routinely performs emergency services, such as towing in County vehicles that have broken down. It also meets special needs during emergency situations, such as immediate repairs to snow moving equipment during winter storm conditions.

The DEM manages the fleet in other ways: making decisions about the replacement or refurbishment of equipment; rotating the fleet among users; disposing of surplus or obsolete vehicles, equipment, and repair parts; maintaining records on costs and usage; and inspecting vehicles for state emissions requirements.

(c) Fleet Composition. The DEM owns and manages a fleet of nearly 2,000 motor vehicles and pieces of mobile equipment. These include police vehicles (patrol cars, unmarked cars, motorcycles, prisoner transport vans, etc.), administrative vehicles (staff cars, multi-purpose vehicles, light trucks, and vans), transit buses, para-transit vehicles, construction and other heavy equipment, heavy trucks, and special purpose equipment.

In addition, the division provides repair and maintenance services to agency-owned vehicles, such as the Mobile Command Post and Liquor Control delivery vehicles. A breakdown of the County fleet by type of equipment can be seen in Table I.

TABLE I
COMPOSITION OF COUNTY EQUIPMENT FLEET

1. DEM OWNED VEHICLES	NUMBER
<u>Police Fleet</u>	655
Fleet Patrol Vehicles	60
Personal Patrol Vehicles	400
Detective & Administrative	150
Motorcycles, etc.	45
<u>Administrative Fleet</u>	400
<u>Light Truck Fleet</u>	180
<u>Heavy Truck Fleet</u>	140
<u>Construction Equipment Fleet</u>	200
<u>Special Purpose Vehicle Fleet</u>	55
<u>Transit Bus Fleet</u>	160
SUBTOTAL - DEM FLEET	<u>1790</u>
2. OTHER COUNTY VEHICLES	
<u>Liquor Control Owned</u>	44
<u>Police Owned</u>	19
<u>Miscellaneous Agency Owned</u>	59
<u>State Owned (Assigned to County Agencies)</u>	7
SUBTOTAL - OTHER COUNTY VEHICLES	<u>129</u>
TOTAL COUNTY FLEET	1919

Source: FY 1985 Budget Submission and data from DEM.

2. Organization. The DEM is organized into the divisional office and three technical sections. The office of the Division Chief includes general administrative functions and the Program Management Unit. The three technical sections are responsible for their own fleets: Automotive Equipment, Heavy Equipment and Transit Equipment.

(a) Program Management. This unit is responsible for management information and operational support functions. These include the vehicle information system, computerized fuel inventory, parts inventory control system, stockroom and warehouse operations, and office automation.

(b) Technical Sections. The responsibilities of the three sections parallel each other for their respective fleets. Each section handles the development of technical specifications for, and the acquisition of, equipment; repair and maintenance; refurbishment or disposal of equipment; scheduling of preventive maintenance and inspections; and contracting for services. The sections are also responsible for general managerial functions, such as personnel management, shop supervision, planning and budgeting, contract monitoring, data collection, and technical reporting.

The Automotive Equipment Section (AES) is responsible for all motor vehicles under 10,000 pounds gross vehicle weight rating. These include primarily the police and administrative vehicles. The Heavy Equipment Section (HES) is responsible for motor vehicles rated over 10,000 pounds, construction and special purpose equipment, and Liquor Control equipment. It also handles most emergency operations and special services. The Transit Equipment Section (TES) is responsible for the fleet of Ride-On buses and para-transit vehicles.

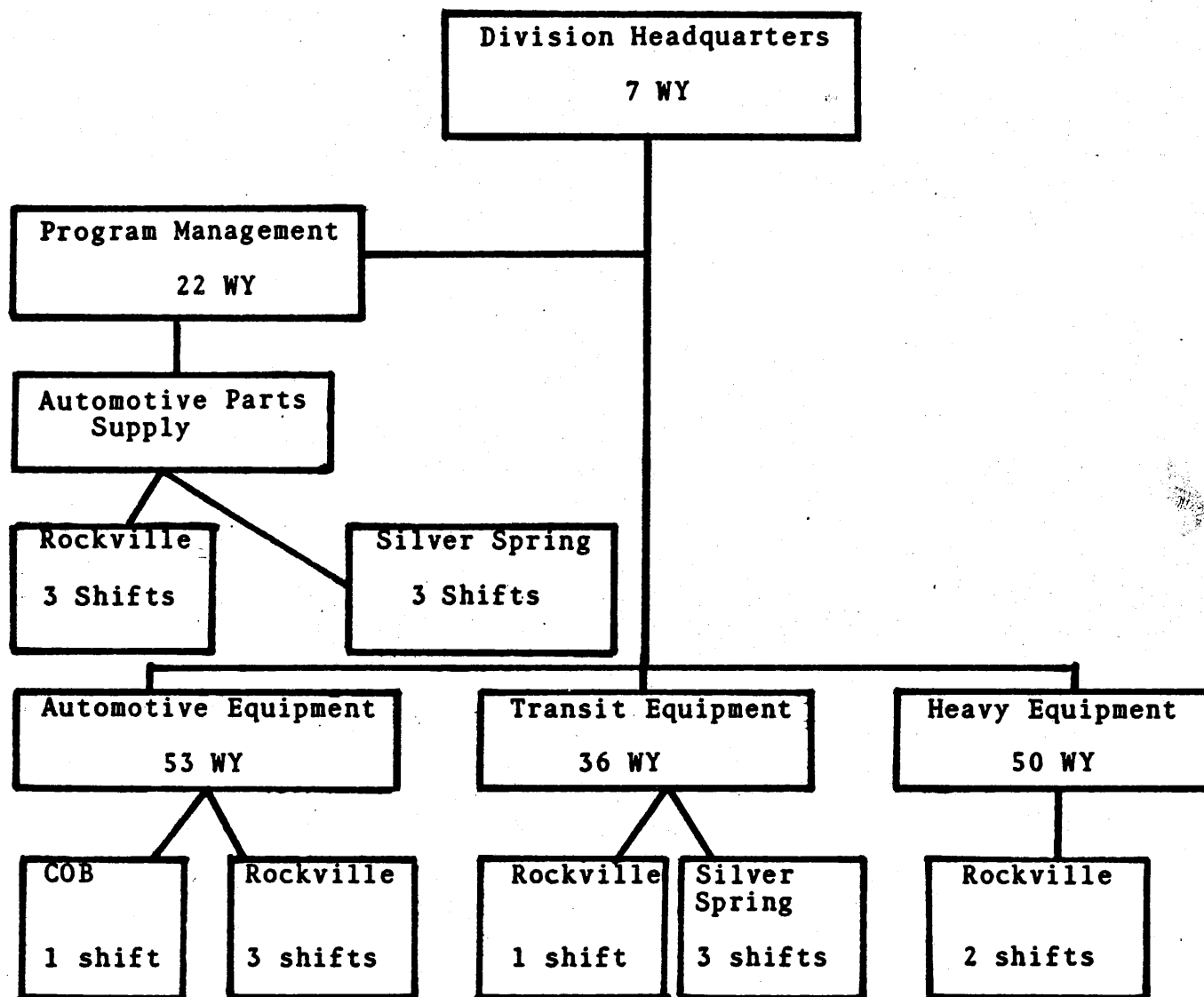
(c) Facilities. The DEM currently operates primarily out of two facilities. The depot located at 1283 Seven Locks Road (Rockville) houses divisional headquarters, most major maintenance shops, and the primary parts stock room. The depot located at 8710 Brookville Road (Silver Spring) is exclusively for transit vehicles and warehouses most of the transit parts inventory. In addition to these locations, the division operates the motor pool located on the ground level of the County office Building parking garage. Individual personnel also may be assigned to remote locations, such as the Gaithersburg DOT depot, to service equipment on site.

Due to severe space limitations, both the Rockville and Silver Spring depots currently operate three shifts, twenty four hours per day, five and a half days per week. This operational crunch should be relieved somewhat in the fall, when a new, larger bus repair facility is scheduled to open at the Silver Spring depot. The new maintenance shop is located in an old liquor warehouse building, which is being totally renovated and has been designed expressly to handle the expanded Ride-On bus fleet. In the longer term, a second new facility is planned for 1986. It will be located at the Montgomery County Service Park on Crabbs Branch Way in Gaithersburg, in a structure to be shared with the planned Ride-On operational center.

(d) Staffing. In FY 1985 the DEM has a total authorized staff level of 168 full-time positions; however, at the beginning of FY 1985 there were 20 vacancies. Chart 1, "Organization of Division of Equipment

Chart 1

Organization of Division of Equipment Management



Organization and authorized workyears (WY) as of 7/1/84.

Source: FY 1985 Budget Submission

Management," shows the distribution of these authorized workyears by organizational unit.

The divisional offices include 29 positions, two-thirds of which are directly involved in the operation and control of the parts inventory. The administrative aides and office assistants report directly to the Division Chief, as does the Program Manager.

The Program Manager supervises a program assistant and the Automotive Supply Supervisor, who is responsible for the day to day operations of the stockrooms and warehouse. There are four Senior Stock Clerks who report to the supervisor, one for each of the three fleets and one with responsibility for the computerized inventory management system. The evening and night shifts are supervised by Stock Clerk IIIs. The stock clerks report either to Senior Stock Clerk or a Stock Clerk III, depending on the shift.

The AES has 53 authorized positions, all but two (who run the COB motor pool) of whom are located at the Rockville depot. It operates on three shifts. The HES has 50 authorized positions, all located at Rockville, where it operates day and evening shifts. The TES has 36 authorized positions. It operates on three shifts at the Silver Spring depot and a night shift at Rockville.

The staffing of the three technical sections is organized similarly. Each is headed by an Equipment Manager (section chief), who has overall responsibility for the management of the respective fleet. Each has a Shop Supervisor reporting directly to the manager, with responsibility for the day to day operations on the shop floor. This supervisor oversees all of his section's work shifts, each of which is headed by a Mechanic Leader (shift foreman).

Mechanics and other shop personnel are under the direct supervision of the shift foreman. On the larger shifts in the AES and the HES, there are Mechanic III positions that act as assistant shift foremen. Mechanic I positions are for automotive mechanics. Mechanic II positions are for heavy equipment or transit mechanics. The shop staff also includes mechanic helpers, welders, equipment operators, auto body repairers, and motor maintenance dispatchers.

3. Operations. The DEM is a "full-service" fleet manager. It operates much like a private rental car company, buying equipment to lend to its customers, even including the cost of fuel in its rates. With only a few exceptions, user agencies do no more than supply the vehicle driver or equipment operator and return the unit for maintenance or repair as necessary. The DEM takes care of everything else.

(a) Equipment Procurement. The acquisition of vehicles and equipment begins as part of the budget process. There are two types of acquisition decisions: replacement vehicles and additional vehicles; and the process is different for each.

(i) Replacement Decisions. Before preparation of any budget request, at the beginning of the prior fiscal year, the DEM determines

which vehicles should be replaced in the upcoming budget. In the case of automotive equipment, there are established age and mileage criteria, as shown in Table II. These criteria are guidelines for identifying the vehicles that should probably be replaced; however, an individual determination is made for each vehicle by the AES chief based on condition, maintenance history, and projected usage. In addition, during the course of the fiscal year other vehicles may become candidates for replacement due to accident damage, mechanical failure, or other problems that render repair uneconomical.

In the case of heavy equipment, the section chief and shop supervisor conduct an annual inspection of most trucks and other equipment prior to the budget season. The inspections are performed on site, at the depots where the individual pieces of equipment are located. Users prepare a list of equipment at the depots with their opinions as to the condition and performance of the equipment.

From the visual inspection, the user feedback, and data on maintenance history, the HES chief establishes three priority lists. P-1 includes all equipment that should be replaced in the next budget due to condition and the projected cost to maintain or repair in the upcoming year. Category P-2 includes equipment that meets or exceeds mileage and age criteria for replacement and appears to need replacement, but that will probably remain serviceable through another year. The P-3 list includes equipment meeting or exceeding replacement criteria but in otherwise acceptable condition.

The TES chief does not conduct a similar exercise because the transit fleet is of relatively recent vintage. None of the equipment is near the condition where it warrants replacement.

Before determining which vehicles and equipment should be replaced, the DEM also evaluates the potential of refurbishment as a cost-saving alternative. For certain specialized equipment, this option may cost only a fraction of the price tag of a new unit. In FY 1984, for example, the DEM, together with the Fire and Rescue Commission, completely refurbished a hook and ladder truck at a total cost of \$67,000, compared with \$340,000 to purchase a comparable new unit.

Once the replacement decision is made, the DEM determines whether the replacements should differ from the old equipment. It takes into account changing user needs and new available technologies. The final list of recommended replacement equipment is submitted to OMB as part of the division's annual budget request.

(ii) Additional Vehicles. Decisions to acquire additional vehicles are generally not initiated by the DEM. Individual user agencies submit a request to OMB as part of their annual budget preparation. DEM reviews these requests for two purposes. It determines whether there are other vehicles or equipment currently in the fleet but not in use that can directly or with modifications meet the needs of the requesting agency. When existing equipment is not available, the DEM reviews the agency's request to determine what commercially available vehicles or equipment are most appropriate to meet the user's needs. It develops cost estimates for budget approval purposes.

TABLE II

VEHICLE REPLACEMENT POLICIES

TYPE OF VEHICLES	USEFUL LIFE (Months)	MILEAGE
<u>Police Fleet</u>		
Fleet Patrol Vehicles	48	70,000-80,000
Personal Patrol Vehicles	54	"
Detective & Administrative	72	"
Motorcycles	60	25,000
<u>Administrative Fleet</u>		
Passenger Cars	84	70,000-80,000
Light Trucks and Vans	84	80,000-90,000

Heavy Equipment Fleet

There are no mileage criteria for heavy trucks; age replacement criteria range from eight to ten years.

Replacement guidelines for construction and special equipment vary greatly in age, from five to fifteen years depending on the type of equipment. There are no mileage criteria.

Transit Equipment Fleet

There currently are no established replacement guidelines for buses, however, such a policy is currently under consideration. The most likely guidelines will be 15 years (180 months) based on a 10 year economic life extended for an additional 5 years by refurbishment.

Sources: OMB memorandum of 1/10/84: E. James Sayer to David L. Scull;
OMB memorandum of 11/23/84: Tony Wright to E. James Sayer
DEM rental rate development data

(iii) Approved Requests. Once replacement or additional equipment has been approved in the budget, the DEM prepares technical specifications for bid. It transmits these to the Purchasing Division in the Department of Finance for preparation and advertisement of a request for bids. The DEM will typically provide Purchasing with a list of recommended vendors to contact for bids; Purchasing may supplement that list as appropriate. When bids are received, the appropriate DEM Section Chief reviews and analyzes the submissions. Bid specifications are quite detailed and may include modifications, optional equipment and related services (such as warranties). Bidders often take exceptions to certain specifications.

The DEM analysis determines whether bidder exceptions are acceptable and how much of a cost penalty, if any, should be imposed; whether options are worth purchasing; and whether all terms of the bid request are met. The DEM recommends selection of a vendor based on this analysis. When that recommendation is for other than the low bidder, the selection must then be approved by the Contract Review Committee.

In the case of transit bus purchases, additional quality control measures are undertaken. Subsequent to selecting a bus vendor, the DEM contracts with an independent inspection company to provide quality control inspectors on site at the manufacturer's plant. These resident inspectors oversee all aspects of the manufacturing process to ensure that vehicles are being built according to specification. The purpose of this program is to catch and correct potential problems before the vehicles are delivered to the fleet. This procedure helps eliminate possible future maintenance and downtime costs, as well as minimizing the potential for a protracted dispute over responsibility for bus performance problems.

For heavy equipment procurement, one option that is frequently used is guaranteed maintenance and repurchase. This option requires a dealer or manufacturer to guarantee a maximum cost for providing all equipment maintenance for a set period of years and a minimum repurchase price at the end of that period. The purpose is to permit manufacturers selling better quality equipment with a higher initial cost but lower lifecycle costs to compete on a fairer basis with other equipment manufacturers. As an option, it is not mandatory; the DEM analyzes bids with and without guaranteed maintenance and repurchase to determine the most cost-effective purchase for the County.

(b) Maintenance and Repair. The DEM performs a full range of shop services in house. These include preventive maintenance, mechanical and body repairs, emergency service, and emissions inspections. There are a limited number of specialized services for which the division does not have an in-house capability or which can be done cheaper or faster elsewhere. Such services are contracted out.

(i) Maintenance Scheduling. Preventive maintenance is performed on a mileage and time schedule as recommended by the manufacturer or as called for by standard industry practice. The purpose is to prevent unexpected breakdowns and to prolong the useful life of equipment. Each section chief establishes preventive maintenance schedules and checklists for all the equipment in their fleets.

There are a variety of inspections and tests to be performed, and fluids or parts to be changed, during scheduled maintenance service visits. The amount of service provided depends upon the particular service interval. It may involve only testing an oil sample and visually inspecting the vehicle; or it may include thorough servicing of several vehicle components.

Responsibility for scheduling individual preventive maintenance visits varies by type of equipment. In general, Ride-On is responsible for identifying and bringing in transit buses that have reached each 2,500 mile increment. The buses receive one of three levels of preventive maintenance, depending on the particular service interval. Automotive equipment, by contrast, tends to accumulate mileage relatively slowly, so it is generally on a time-based maintenance schedule. The DEM sends out regular notices to users in advance of the scheduled service dates. The one major exception is the police fleet, because its vehicles tend to accumulate mileage rapidly. Police officers must schedule preventive maintenance visits for patrol cars every 5000 miles. The heavy equipment fleet varies greatly in its maintenance scheduling requirements. Some equipment, such as leafers, is seasonal in use and maintenance. Others, such as heavy trucks, are vehicles with regular time-based schedules. In general, the HES is responsible for tracking maintenance requirements and notifying users of scheduled service.

(ii) Repair Shop Procedures. Whether a vehicle comes in for scheduled or unscheduled maintenance, the shop procedures are essentially the same. The operator parks the vehicle and reports to the service desk. The DEM service desk writer prepares a multi-copy work order ticket including information about the vehicle and why it is in the shop (scheduled visit, nature of operational problem, etc.). This ticket accompanies the vehicle until the visit is complete.

At the start of each shift, the foreman reviews all work to be done and assigns particular repair or maintenance jobs to individual mechanics. The scheduling of work load is based on a variety of factors, such as fleet priority and work backlog, and is basically a judgment exercised by the shift foreman or shop supervisor.

Work is begun. The foreman (and assistant if one is on that shift) move from job to job, conferring with each mechanic on the diagnosis of the vehicle's problem and the appropriate solution. If an unusual or recurring problem is apparent, the foreman may review the file with that vehicle's repair history.

As parts or supplies are needed, the mechanic obtains them from the stockroom. Parts charged out by a mechanic are entered on the work order for that vehicle. There are dollar limits on the authority of mechanics to obtain parts without the shift foreman's approval. Similarly, over a certain amount the shift foreman must obtain shop supervisor approval; over a higher level the section chief or division chief must approve. These dollar amounts vary slightly among the three sections, owing to the different nature of their equipment.

As a repair is performed, the nature of the problem and the work performed, including labor hours and parts required, are entered on the ticket. During a complex repair job, the foreman (or assistant) may check on various stages of the repair before completion. If a part is not available from the stockroom it will be ordered and the vehicle set aside temporarily for other work.

Once a job is completed, the foreman will test drive the vehicle to ensure that the repair job is done correctly. If the work is approved, the vehicle is released for pick-up by the user. The service desk is responsible for notifying the user of completion of the work.

(iii) Contracting Out. The general policy of the DEM is to contract out for services that can be performed better, faster, or cheaper than in-house work. Specific decisions about whether or not to contract out a particular function are basically economic decisions. They depend on factors such as the amount of specialization required, existing in-house capabilities, contractor cost and time estimates, in-house workload volume, potential legal liabilities, manufacturer/contractor warranties, and the availability of personnel slots.

Some of the functions that are contracted out include: autobody repair and painting, component rebuilding, radiator repairs, upholstery repairs, car washes, repairs to shop equipment, repairs to fuel pumps, engine and transmission exchanges, oil analysis, warranty repairs, specialized tire treatment, and auction sales. Current plans are additionally to contract for the majority of towing services.

(iv) Emergency Services. The DEM routinely performs emergency road service. Vehicles may break down on the road or develop an unsafe driving condition. The division operates several tow trucks, which can be dispatched to bring in a disabled vehicle. These tow trucks are also used for transporting non-operating equipment for repairs at other facilities.

When a Ride-On bus is disabled, another bus is dispatched with the mechanic to permit driver and passengers to continue on. Other disabled vehicles are generally locked up, with radios and other equipment in the trunk, and can be left by the operator if in a safe location until picked up. The one major exception is a police motorcycle; the officer must remain with the vehicle.

During winter storm conditions, the DEM operates on a snow emergency basis. Snow removal equipment receives the first priority; the objective is to keep these vehicles operating and on the road. Under adverse conditions, significant HES overtime may be required to keep up with the demand for emergency repairs. Also during the cold weather, the HES may be called upon to make emergency deliveries of fuel oil. There are private contractors to the Department of Family Resources who ordinarily provide this delivery service, but the DEM is available as a back up in last resort.

(v) Miscellaneous Services. There are various other maintenance and repair services performed by the DEM. As a fleet operator, the

division is licensed to test and certify its fleet for the Maryland Vehicle Emissions Inspection Program. Currently these tests are scheduled separately from other maintenance work.

The division is a certified warranty repair facility for most major vehicle manufacturers. This permits the County to perform warranty services in-house and bill the manufacturer for reimbursement. The DEM also performs certain work on a direct charge basis for other County agencies. It maintains Department of Liquor Control warehouse equipment. It also performs welding services as demanded.

(c) Inventory. The DEM maintains large inventories of repair parts and fuels for the County fleet. In total numbers, by either line items or dollar value, the DEM inventories are the largest in DOT and probably anywhere in County government.*

In theory, the DEM inventories are "owned" by the Finance Department. Parts and supplies are "purchased" from the inventory by the DEM only when charged out to a repair work order or fuel ticket. In practice, the DEM controls and operates the inventories. Finance acts only in an auditing and oversight capacity, primarily through the end of the year physical inventory.

(i) Stockroom and Warehouse Operations. The parts inventory is maintained at the two locations where repair work is performed. The automotive and heavy equipment parts inventories are kept in the stockroom at the Rockville depot. The transit equipment parts inventory is kept in a warehouse at the Silver Spring depot. There are approximately 6,000 line items kept in the Rockville inventory and 1,500 line items kept in the Silver Spring inventory. On average, the total dollar value of parts actually in stock is \$730,000.

Mechanics in need of parts for a repair in progress come to the parts counter, where they are assisted by a stock clerk. There are various references (handwritten cards, printed catalogues, and computerized listings) that the clerk uses to identify the appropriate part number and determine whether it should be in stock. If the part is listed as in the inventory, the clerk then checks the actual stock level and removes the requested part.

The repair part is charged out to the mechanic by entering the part number on the multi-copy vehicle repair work order. One copy of the work order is retained on file in the stockroom until the repair is completed. That copy must be matched back up with the rest of the repair ticket to charge out additional parts on the repair job. This internal control measure reduces the possibility that parts will be charged out of inventory but not accounted for.

* Centralized data on the contents of County inventories appears to be inadequate. This issue will be addressed in an upcoming OLO report on materiel management.

(ii) Ordering and Purchasing Procedures. When the actual stock level for a part appears low (or is zero), or when a requested part is not a normal inventory item, the stock clerk at the parts counter notifies the Senior Stock Clerk responsible for the appropriate fleet. The counter person can not order parts.

For restocking inventory parts, the senior clerk will verify the need and determine whether an order has previously been placed. If the needed part is not already on order, or if it is a non-inventory item, an order request is sent to the Stock Clerk III who acts as the DEM purchasing agent. This clerk verifies that a needed part is not on order, identifies the appropriate vendor, and places the order. When a vendor under contract is unable to supply a part, the agent can usually order it from a secondary vendor under contract. In an emergency, orders can also be placed after approval from Purchasing with parts suppliers who are not under County contracts.

(iii) Fuels Inventory. All County vehicles obtain their fuel from a computerized dispensing system known as Gasboy. This fully automated system was installed in FY 1979 to replace the previous fuel ticket system, which did not provide an adequate accounting of fuel consumption. Gasboy has virtually eliminated discrepancies between pumped gasoline and recorded consumption.

Nine dispensing units are located around the County, primarily at DOT depots. The system typically holds around \$140,000 worth of fuels in stock. The DEM has taken the lead in organizing a cooperative fuel purchasing program through the Council of Governments, which has produced significant savings compared to the prior system of procuring fuel independently.

Equipment operators use a special card assigned to the vehicle to obtain fuel from the pump. The card is coded to designate the proper fuel (leaded, unleaded, or diesel) and allows the computer to record details of the transaction, including stock number, gallons, date, time, and mileage.

(iv) Obsolete and Surplus Parts. The DEM maintains an active program of identifying inventoried parts that are not needed due to changes in fleet composition or low demand. During the past several years, this effort has reduced the number of inventory line items by 35% and has moved nearly \$175,000 worth of parts off the inventory books.

Whenever possible, the obsolete and surplus parts are returned to vendors for credit or exchange, sometimes with a small handling charge from the supplier. Other parts have been sold at auction, however, much of the obsolete inventory remains stored in a designated part of the warehouse. As these parts are sold or traded, the DEM is charged by Finance for the original cost; any revenue or new parts brought in offset that expense.

(d) Management Information Systems. The DEM currently depends upon four separate and distinct computerized systems to compile and analyze data for managerial purposes. The MSA inventory control system handles data on the inventory of repair parts, suppliers, and materials. The

Mainstem vehicle management system focuses on the operations and maintenance of the equipment fleet and repair shops. The Gasboy system provides all the fuel related data. FAMIS is the financial accounting management information system. There are currently only limited and indirect connections among the three computerized systems.

(i) Inventory Control. The County uses a proprietary computer software package for inventory control known as the MSA system (named after the vendor, Management Science America). It is a batch-entry system that produces a series of regular reports for management use.

The MSA automated inventory control system was initially acquired by the Finance Department in early 1980. The County purchased the entire system, which includes three modules: inventory, purchasing, and usage. Over the past four years, under its maintenance agreement, MSA has provided the County with regular updates as this system has been improved and modified, although only one major update has been implemented.

There were a series of technical problems with MSA during its initial implementation. The first part of the system, the inventory module, was not working properly until late 1982. Although MSA was purchased to serve as the centralized recordkeeping and control system for all County inventories, only three DOT division inventories (Equipment Management, Operations, and Traffic Engineering) and the Small Store's inventory have been successfully implemented on the system's inventory module. The DEM served as DOT coordinator for its implementation effort.

As a result of the implementation problems, the MSA system has never been placed in full operation. The purchasing and usage modules have not been brought up on the computer. Consequently, the DEM and other users have been able to utilize only a fraction of the system's capabilities.

One copy of each completed repair ticket is forwarded daily from the DEM to the County's Computer Center. Data pertaining to the repaired vehicle and the parts used (but not labor hours or repair type) is keypunched and entered into the computer. That information is processed through the MSA system. Similarly, daily reports from the DEM on parts received into inventory are sent to the computer Center for entry into the MSA system.

The turn around time for batch data processing is targeted for three days. All data in the reports generated by the MSA system is therefore outdated by at least that much time when the reports are received back at the DEM. During periods of heavy workload it may take considerably longer; at one point during 1982, the backlog was several weeks.

The MSA system produces an inventory activity report daily. This report includes data on all inventory transactions: parts received from vendors, parts charged out to repairs, and all line items that are out of stock. It includes data on both routine inventory line items and non-stocked special order parts. At the time that this daily transaction data is processed, the MSA system also automatically revises its files and calculates certain inventory control factors; however, this management information is normally available only through the monthly reports.

The MSA system produces several reports on a monthly basis. The supply catalogues are references used regularly by counter personnel. They list basic data about inventory line items, such as their physical location, and are cross-referenced by part description, vendor, and MSA number. The inventory stock status report provides most of the data important to management and control of the inventory. This information includes current stock levels, inventory valuation, demand histories, reorder points, economic order quantities, and safety stock levels. Other more specialized reports, such as demand history for the prior twelve months, can also be generated.

The monthly status report is a snap shot in time of the inventory. As with all MSA reports, it is at least three days outdated when produced. Its informational value declines steadily over the month as it becomes progressively less current. By the middle of the month the document is generally no longer considered useful.

(ii) Fuel Usage. The Gasboy system was implemented by the DEM in February 1979. This system provides the DEM with the capability to analyze fuel usage in a variety of ways. It generates information on miles per gallon and cost per mile for each vehicle, total fuel consumption and cost by department and by vehicle domicile, and the amount of each type of fuel dispensed at each station. The data is regularly analyzed to measure the effectiveness of energy conservation measures and to track the performance of the various vehicle fleets.

(iii) Vehicle Management. The DEM contracts with Mainstem, a service bureau, for fleet data processing requirements. This program began in March 1977 and has been regularly renewed since then. Currently the DEM spends approximately \$54,000 annually on this contract.

Every month copies of all work orders completed since the prior reporting period are batched together and shipped to Mainstem headquarters in New Jersey. The Mainstem staff keypunch work order data into their computer system and process this information on the vehicle and service work performed.

At the same time, the County's Computer Center prepares a magnetic tape of all vehicle and repair parts data that was entered into the MSA system. That tape is shipped to Mainstem, where the parts data is merged with the other work order data. Similarly a tape of fuel consumption data from the Gasboy system is prepared and sent to Mainstem, where it is also merged with the other vehicle information.

Mainstem provides monthly management reports based on the repair, parts, and fuel data submitted for each vehicle. There are, however, delays inherent in a service bureau operation: the time required for preparing, shipping, processing, and reshipping data. Consequently, Mainstem reports are typically received two to three weeks following the close of the reporting period.

There are a variety of Mainstem reports available to assist the DEM management in analyzing shop and fleet performance. They can generally be described as either summary or exception reports.

Summary reports compile data on costs and activities for the entire fleet and aggregate it into various useful categories, such as vehicle class or repair type. Such reports provide historical comparisons of performance for any part of the fleet or shop operations, comparing current data with the same period last year, the entire prior twelve months, or the relevant lifetime record.

Exception reports focus on individual pieces of equipment that exceed pre-established parameters for costs or activities. These reports are designed to highlight particular problem vehicles and to spot unusual trends that may reflect potential problems in types of equipment or parts of the shop operations.

There is a wealth of management information in this system, although it is not all easily usable. Mainstem reports generate information about the relative expenditures or repair work performed on major vehicle component systems (brakes, power plant, electrical, etc.), by type of work order (scheduled, unscheduled, road call), and by various sub-fleet categories. They also generate certain productivity data, such as work orders per mechanic or per unit. Nevertheless, because Mainstem is a service bureau operation with many clients, it is not very flexible in varying the reports that it generates. The DEM cannot easily analyze its work order data except through the established Mainstem report formats.

One Mainstem feature that compensates for this inflexibility is the availability of a fleet advisor. This expert consultant in maintenance management meets monthly with the DEM management to review the most recent performance reports. The advisor services about twenty other fleets, mostly publicly owned. He offers expert advice on identifying and solving problems evident from the data and provides comparative information concerning the experiences of other area fleets. The DEM considers this advisory service particularly valuable.

(iv) Financial Accounting. FAMIS is the Finance Department's computerized accounting system, which is used County government-wide. Through this system, the DEM is billed for its expenditures and bills other agencies for equipment rental and other charges (for more details, see Section 4: Financing). All the DEM billing data, such as rental rates, used in FAMIS is derived from data in the Mainstem system. The development of these factors is performed outside of these two systems. The DEM uses an in-house micro-computer to manipulate data from Mainstem to calculate the rates and charges that are ultimately used in FAMIS.

(v) System Upgrade. Since 1982 the DEM has been seeking to upgrade its management information systems to an integrated, on-line "state-of-the-art" computerized fleet management system. Their concept has been to develop a self-contained mini-computer based automated system, which would combine the information currently kept on the three separate systems. It would provide immediate data availability and greater flexibility in analysis and reporting, at a cost that should be comparable with current expenditure levels.

At the time that this evaluation was performed, the OMB Division of Management Systems (MS) had not concurred in the DEM plans. Their

position was that only a mainframe system should be considered because the existing MSA inventory system is mainframe and the County's policy has been to maintain centralized inventory records. MS believes that the technical problems with maintaining inventory control on the mainframe and fleet management on a mini-computer are overwhelming.

A series of meetings and studies was unable to resolve these disagreements over an extended period of time. The DEM prepared an exploratory request for proposals (RFP) from computer system suppliers in late 1982. That RFP was designed to solicit proposals for integrated fleet management systems operating on either the mainframe or a mini-computer. MS requested redesign of the request. The Contract Review Committee sustained that objection, rejecting the RFP due to the issue of mainframe utilization. Further study of DEM needs and general DEM dissatisfaction with MS performance have resulted in an impasse on this upgrade. Since this study was conducted, however, an agreement has been reached between DOT, OMB, and Finance, as reflected in Section VIII, Executive Branch Comments.

4. Financing. The DEM is financed by a self-supporting internal service fund, the Motor Pool Fund. All operating and capital expenditures are included in the division's annual budget, which is funded primarily by revenues received in the form of equipment rental chargebacks to the user agencies. Additional revenues come from resale of equipment, transfers from the General Fund, warranty reimbursement, and other sources.

The objective of such a financing system is to fully allocate the costs of providing vehicles and equipment to the programs that use them. This chargeback system provides a more accurate picture of the actual costs of providing a given County service by including vehicle support requirements directly in that program's budget.

(a) Rental Rate Development. Equipment rates are the key to the motor pool chargeback system. Every County agency must budget its vehicle usage based on the rates developed by the DEM and approved by OMB. The total of all these budget decisions translates into the demand for equipment and services that must be met by the DEM.

The DEM rental rates are designed to fully recover all costs of operation and to plan for future fleet replacements, with an allowance for other sources of revenue. Equipment rentals currently represent about 87% of the total program cost. The rental rates are based on a comprehensive cost analysis conducted annually by the DEM, with appropriate adjustments for projected changes in expenses and operations.

If everything goes according to plan, that is, if agencies use the number of vehicles budgeted and if the DEM incurs costs as projected, the chargeback system will be self-financing. If agencies turn in vehicles unexpectedly or if the DEM costs are higher, there will likely be a deficit in the motor pool fund. The converse may also happen, resulting in a surplus.

(i) Rate Structure. The rental rates consist of two basic components. The flat rate component is a fixed monthly charge for vehicles

assigned to a County agency, regardless of amount of usage. There are also daily and hourly flat rates for vehicles temporarily borrowed from the COB motor pool. The mileage component is a charge per mile of vehicle usage; this part of the DEM rental bill, therefore, varies with the amount of usage an agency's vehicles receive. For some heavy equipment, however, mileage is not an appropriate measure of usage, so there is only a flat rate component.

The reason for separating the rental structure into flat rates and mileage rates is to make the DEM charges correspond as closely as practical with actual costs. Flat rates are based on the fixed costs of the DEM operation, which do not vary with the amount of vehicle usage. Mileage rates are based on the variable costs, which are directly related to vehicle usage. These components, described below, are summarized in Table III.

(ii) Flat rates. The major fixed costs of the DEM operation are replacement, overhead, and insurance. The monthly replacement cost component is determined by calculating the net current replacement cost for the particular type of vehicle (current purchase price minus estimated salvage value) and dividing it by the useful life (in months) of the vehicle. The useful life established for each type of equipment is generally based on the historical replacement experience that has resulted from typical patterns of usage by County agencies.

Overhead and insurance cost components are calculated for each type of vehicle based on a fairly complicated cost allocation analysis. The overhead component include all indirect labor costs: salaries and fringe benefits for managers and supervisors, professional and administrative support staff, and stockroom personnel; and all operating expenses: utilities, computer services, obsolete parts, repair and replacement of shop and other equipment, building maintenance and security, chargebacks from other agencies, etc. Insurance costs include workman's compensation and vehicle liability charges from the Finance Department.

Overhead costs are divided equally among the three sections. Within each section, costs are allocated among each of the sub-fleets and then further broken down into the different types of vehicles. Those cost allocations are based on the level of shop activity, which is measured by the total cost of parts and direct labor. They attempt to reflect the actual contribution of each type of vehicle to total overhead.

(iii) Mileage Rates. Rental charges per vehicle-mile range from as low as \$0.13 for administrative station wagons to over \$1.00 for some of the largest trucks. The major cost components of the mileage charges are fuel, parts and labor. These components represent the variable costs that, in the long run, are directly related to the usage of the vehicle. Actual historical costs for each vehicle are tabulated and aggregated to develop average per vehicle costs for each of the sub-fleets of similar

TABLE III

MAJOR COMPONENTS OF RENTAL RATE CHARGES

I. Flat Rates.

1. REPLACEMENT

- (a) Current replacement cost
- (b) Salvage value
- (c) Useful life

2. OVERHEAD

- (a) Salaries & Fringe Benefits
 - (i) management & supervisors
 - (ii) professional and clerical staff
 - (iii) stockroom operation
 - (iv) retirement, health, social security (indirect staff)
 - (v) salary charges from other departments
- (b) Operating expenses
 - (i) utility charges (heating, electric, telephone, water)
 - (ii) computer services (MIS and outside vendors)
 - (iii) obsolescence
 - (iv) repairs to shop equipment, fuel pumps, etc.

3. INSURANCE

- (a) Workmen's compensation
- (b) Vehicle liability charges assigned by Finance

II. Mileage Rates.

1. FUEL COSTS

- (a) Fuel cost per gallon
- (b) Mile per gallon for fleet
- (c) Major cost of variable rate component

2. PARTS COST

- (a) Parts to repair vehicles
- (b) Outside costs of repairs (parts & labor)
- (c) Accident repairs (parts & outside costs)
- (d) Vandalism/driver abuse or negligence

3. LABOR COST (DIRECT LABOR)

- (a) Mechanic semi-burdened labor cost
 - (i) salaries
 - (ii) fringe benefits (annual leave, sick leave, holidays)
 - (iii) accident repairs
- (b) Semi-burdened labor rate (average FY'84 - \$14.50)
- (c) Average industry fully-burdened shop labor rate (\$30 - \$40)
- (d) DEM fully-burdened labor rate (\$22.50/hr.)

vehicles.* After adjustments are made for projected changes in factor prices, these cost components translate into the mileage rates.

Fuel is typically the largest variable cost element. The parts component includes the cost of all inventory and special order parts, and all outside repair work done under contract. The labor component is based on the actual direct labor cost for mechanics and other repair personnel, which includes salaries and fringe benefits. This labor cost, which averaged \$14.50 in FY 1984, is sometimes referred to as the semi-burdened labor rate, because it does not include any overhead costs. The mileage charge includes all accident and vandalism damage repair as these are not included under the insurance cost component of the flat rate charge.

(b) Accounting. The DEM does most of the accounting work for the motor pool fund. Monthly, it bills for each agency's flat rate and mileage charges through the County's financial accounting system, FAMIS. The appropriate charges are debitted against the agency pseudo-code accounts and credited to the motor pool fund. The money transferred through this chargeback process is then available to be spent by the DEM.

The DEM processes its payment vouchers and audits them by random sample to ensure that vendor prices adhere to contract provisions. It tracks budget expenditures by category, monitoring the rate at which funds are expended and cross-checking FAMIS data against Mainstem data. The DEM audits its monthly billing charges, as well as the data entered into its management information systems, to ensure that pseudo-code entries are correct. It also audits all payroll and fringe benefit records against divisional records.

(c) Fund Balances. Historically the motor pool fund was prone to chronic deficits, which were caused primarily by charging rental rates that did not realistically reflect the cost of providing equipment. This situation was exacerbated by the sharp run-up in fuel prices experienced during the 1970's. The undercharge problem was highlighted by OLO Report 78-2 and has since been corrected.

In the 1970's, deficits were resolved with appropriations from the general fund. During the past four fiscal years, however, with increased equipment rental rates and better cost control efforts, the DEM has consistently operated in the black. In fact, the motor pool fund has actually taken in \$4.2 million over expenditures. It eliminated a deficit that exceeded \$1.6 million at the start of FY 1981 and had an estimated total at the end of FY 1984 of nearly \$2.6 million in retained earnings.

* This information comes from all three of the existing management information systems and is merged together by Mainstem. Due to the inflexibility of Mainstem reporting formats, however, this cost data must be manipulated into a format usable for rental rate development by a local computer company under a separate data processing contract.

V. REACTIONS OF USER AGENCIES

1. Agencies Surveyed. The DEM exists solely to serve the needs of County agencies. Consequently, the reactions of its users, the DEM customers, are a central element to any evaluation of this program. Since nearly all County agencies are served, not all users could be interviewed. A sample of selected agency experiences were studied, concentrating on the largest users in each fleet.

The majority of agencies use primarily automotive equipment, which is divided into two fleets: public safety and administrative. The Police Department constitutes by far the largest share of public safety vehicles. The administrative fleet includes the greatest number of different user agencies, so three departments with extensive field work were selected as of interest: Housing and Community Development (Code Enforcement and Home Improvement); Health (Licensure and Regulatory Services); and Environmental Protection (Construction Codes Enforcement).

For the transit fleet, there is only one user, the DOT Division of Mass Transit, which manages both the Ride-On and para-transit operations. The heavy equipment fleet includes a variety of users; however, the large majority of its equipment serves the DOT Division of Operations.

2. Equipment. With a few exceptions, the general opinion was that DEM secured equipment that was appropriate to agency needs. The County's early experience (pre-DEM) with Ride-On equipment was not satisfactory; however, all those vehicles have since been removed from the fleet. The DEM has made several procurements of state-of-the-art thirty foot transit buses, which have met with nearly unqualified Ride-On approval. Disagreement over whether to procure larger buses was resolved in favor of Ride-On's preference for a fleet composed exclusively of small buses.

The highway maintenance program in DOT operations is generally satisfied with the type of equipment available. They participated in the DEM testing of propane fuel trucks; the performance was not satisfactory and those vehicles were removed from the fleet. Their major complaint with equipment is that there is an undue emphasis on establishing minimum specifications and selecting the lowest bidder. The perceived outcome is that DEM does not always procure good quality, highly reliable equipment, resulting in excessive repair downtime. Concern was also expressed that there is inadequate user participation in the final decisions concerning which pieces of equipment to replace during the budget cycle.

The Police also appeared generally satisfied with the quality and range of equipment available through the DEM. Except for an occasional glitch, the DEM is considered good in developing procurement specifications that meet Police vehicle needs. The department expressed satisfaction with current efforts to upgrade the detective fleet, such as the purchasing of used rental car company vehicles.

The major issue has been the program to reduce fuel consumption by shifting the fleet to more efficient six cylinder cars. The Police are concerned that there be no loss of vehicle performance or usability

affecting the work needs or safety of officers. An initial trial of ten Ford Fairmonts proved unsatisfactory; however, the current choice of Chevrolet Celebrities has worked out well. Forty-five will be added to the fleet this year, representing almost fifty percent of new patrol cars. The only other serious concern regarding police equipment was the belief that the current mileage replacement guidelines for patrol cars were too high and that officers may be at risk during high speed operations.

Administrative fleet users are generally less satisfied with the quality and appropriateness of their vehicles. The most significant complaint is that some users must use ordinary passenger cars for field work that regularly requires off-road driving, for which four wheel drive vehicles would be more appropriate. This mismatch allegedly results in excessive vehicle damage and increased downtime. Certain fleet vehicles, such as Ford Pintos, have a poor reputation among users, due to the belief that they experience a greater frequency of problems.

Some users went so far as to suggest that these equipment shortcomings seriously affected their ability to effectively meet their full mission. There is an overall sense of dissatisfaction with the level of input that these user agencies have regarding administrative vehicle replacement and procurement decisions.

3. Maintenance and Repair. User agencies hold generally favorable views in regard to the overall quality of DEM maintenance and repair work. Some rumblings of discontent are heard, particularly concerning the amount of time it can take to get a vehicle repaired.

Ride-On is the most satisfied user overall. To some degree their high level of satisfaction is attributable to a situation that existed prior to the beginning of the system expansion in August; until then the fleet was operating with a very high proportion of spare buses (over 40%). There was, consequently, little pressure on the TES to meet the minimum number of buses required for peak demand periods.

Generally, preventive maintenance and emergency road service are rated as very good. Some problems have been experienced, however, with higher rates of repair comebacks* among buses serviced on the night shift at Rockville. By this January, the TES will be put to a truer test of its maintenance and repair performance, as the Ride-On expansion will be completed and the proportion of spare buses in the fleet will drop to routine levels (about 10%).

Heavy equipment users seem fairly satisfied with maintenance and repair services, although there are certain problem areas. DEM response during snow emergencies is rated excellent for their ability to keep the vehicles on the road. There are some problems with comebacks, but the

* Comebacks refer to vehicles that come back into the shop within a short period for a problem that is identical or closely related to the original repair. They indicate poor quality control.

major concern is the amount of vehicle downtime. Logs kept by the Highway Maintenance Section indicate that thirty-three pieces of equipment on average are in the shop at any one time. Shop times for heavy equipment repairs average nearly three weeks, even including preventive maintenance visits that are completed in 24 hours.

The Police Department is marginally satisfied with the maintenance and repair services, finding them adequate overall but with serious problem areas. Currently, the most significant problem is with extensive delays in scheduling patrol vehicles for preventive maintenance; the back-up has gotten as long as seven weeks this summer. The Police recognize, however, that the problem is partly of its own making. Some officers had not been scheduling vehicles for preventive maintenance on time, which caused a backlog of work once the Department cracked down on this operator practice. The DEM has adopted a series of measures in conjunction with the Police to eliminate this problem by the Fall.

The Police have identified additional problems in the timeliness and quality of repairs. The department did not have any hard data available, however, it estimated that time spent by a typical police vehicle in the repair shop was 1-2 weeks, except for routine preventive maintenance visits, of which probably 80% are completed within 24 hours. There was also concern expressed about vehicles on the DEM ready-line not actually being ready, about vandalism to vehicles at the Rockville depot, and about a high rate of repair comebacks, although evidence of these problems is only anecdotal.

The Police specifically noted that the DEM was generally very good at meeting emergency response needs: quickly repairing the Mobile Command Center, generally towing in disabled patrol cars promptly, and providing various services during winter storm conditions. They also rated the quality of the DEM in-house body repair work as excellent, especially in contrast to the quality of contractor performed body repairs.

Administrative fleet users expressed the least satisfaction with the DEM maintenance and repair work. The most severe complaint was with the amount of time that it took for repair work. Logs kept by the Health Department over a six month period (9/83 - 2/84) indicate that the average repair time was over 12 days. Similarly, logs kept by DEP building inspectors during a similar period (12/83 - 6/84) reveal an average time of nearly 15 days per shop visit. One consequence of these long repair times is that several users indicated that they do not ordinarily take vehicles in for minor problems until the problems get worse and affect driveability or safety.

Although none of the users kept records on comebacks, these were also a common complaint. Several attributed part of this problem to particular vehicles that have a history of frequent repairs or others that are not appropriate for their severe conditions of use. In addition, there was also a belief that the quality of preventive maintenance checks is not as high as it should be and that potential problems are not being caught on scheduled visits.

4. Costs. The overall reaction of user agencies were that DEM costs are generally reasonable, but some specific problems were cited. The most common complaint concerned the flat rate charge for vehicles in the shop for long repair periods.

Many administrative fleet users require an automobile on a daily basis for the performance of their duties. Consequently, when assigned vehicles are in the shop, the user must check-out a car from the COB motor pool and pay a second flat rate charge (mileage charges are only incurred once). At least one department alleged that times had occurred when pool vehicles were not rented because money was not available in the budget to pay for the additional flat rate charges. Other departments may maintain a couple of additional vehicles over their true minimum need to ensure that there are always enough available units for daily field use.

Heavy equipment users have a similar complaint, although there is no double-billing as such. Certain equipment may remain in the repair shop for as long as four to five months due to the complex nature of repairs, difficulty in getting parts, and heavy workloads. Although the equipment is not available for use during this extended repair period, the user must still pay the flat rate charge. In addition, it occasionally becomes necessary to rent equipment from private companies, which is effectively a double charge. Nevertheless, DOT Operations recognizes that most of the construction equipment it uses is not readily available in the private rental market and that, when equipment can be rented, the prices charged are typically significantly higher than the DEM rates.

The Police indicated one concern regarding the replacement component of the flat rate charge. There is a belief that the monthly charge is not appropriate in comparison to the rate at which police vehicles are actually replaced, that the Police Department budget may inadvertently be subsizing other elements of the DEM.

5. DEM Responsiveness. Overall, there is a high level of regard for the responsiveness of the DEM. User agencies generally commented that working relationships with the DEM were good to excellent. All the departmental fleet coordinators (or equivalent points of contact) reported that the divisional management was always responsive to inquiries or problems. Most users indicated that the DEM always tried to be responsive in meeting needs brought to their attention, such as to get a particular vehicle repaired in a hurry. Although the same high regard does not always filter down through the ranks, there was no suggestion that the DEM did not try to do its best or that it was in any way uncooperative.

Certain common problems were cited. Users indicated that they are not given any estimates of job completion time, nor are they generally notified when the work is finished. Consequently, there is noticeable frustration over the constant calling to check on vehicles in the shop and occasional repaired vehicles that sit for days before the user becomes aware of the need for a pick-up. Several administrative fleet users indicated that there was inadequate communication regarding their needs for and the availability of more rugged equipment.

VI. ANALYSIS AND FINDINGS

This section presents the analysis of the DEM performance. It includes the findings regarding each aspect of the equipment management program and the user reactions, as described in Section IV and V respectively.

1. Objectives. One finding of this evaluation is that the DEM objectives as described at the beginning of Chapter IV are appropriate. There are several reasons for making that determination. One is that these objectives have been expressly set out in various formulations in the past four budgets submitted by the County Executive and approved by the County Council. If there were serious policy reasons to question the goals and strategies being pursued by the DEM, they would have been raised during the budget review process. None has been.

The second reason is common sense. The rationale for having an equipment management program is that County agencies need vehicles and equipment to carry out their duties and responsibilities. It is only reasonable that such a program should seek to fully meet these needs at minimum cost, regardless of how it is organized, managed, and financed. This common sense principle is also known as cost-effectiveness.

A third reason is the apparent lack of additional or alternative objectives that would be more reasonable than the course currently being pursued. Few suggestions surfaced in the course of this study, but two possibilities that could be considered would be to expand the DEM role to include: (1) setting policies regulating equipment usage by agencies and individuals and (2) allocating equipment resources among programs.

These possible alternative objectives might seem attractive from a pure efficiency point of view. The DEM is the County's equipment expert. It could potentially be more efficient if it controlled every factor that affected its costs.

The alternatives should be rejected, however, because implementation of such objectives would contradict established principles of public administration operating within the Executive branch; and there is no evident advantage to doing so. The Chief Administrative Officer sets equipment usage policies; and the County's budget process, administered by the Office of Management and Budget, makes resource allocation decisions affecting agency equipment levels.

Both of these roles involve setting priorities among County programs. The DEM has no expertise in that function nor would it be appropriate to delegate such policy-making responsibilities to that level of government. It would transform the DEM from a serving agency to a dictating agency.

In summary, the DEM is pursuing the most sensible and appropriate objectives. There is no apparent reason to reconsider its current goals and strategies.

2. Resources. The nuts and bolts of this evaluation, so to speak, are determining whether the DEM has the right tools get the job done. Its performance is very much affected by the quality and quantity of resources at its disposal. In this context, resources refer to factors other than the budget level. They include the organizational structure, facilities and equipment, personnel, management information systems, and support services from other County agencies.

(a.) Organizational Structure. As noted earlier in this report, the equipment management program was upgraded to divisional status in 1981, a change that had important consequences. It greatly increased the level of direct managerial resources available, from only a Section Chief and his Deputy to a Division Chief, three Section Chiefs, and a Program Manager. These additions enable management to more effectively supervise and control a program that had experienced a 74% increase in staffing and a 127% increase in budget over the course of the prior six fiscal years.

Creation of the new division raised the visibility of the equipment program, strengthening the role of the fleet manager, who now reports directly to the Director of Transportation, and eliminating an unnecessary layer of management oversight. Under the prior arrangement, major users of heavy equipment were under the same manager as the equipment section, inevitably creating pressures on equipment management priorities. Now all users are on a more equal footing, better reflecting overall County priorities.

Internally, the DEM divides itself into units that largely parallel the structure of its fleets. Each technical section is a self-contained organizational unit, responsible for every aspect of managing its particular fleet and supervising its own personnel and shop operations. Internal support services, primarily inventory and recordkeeping, are centralized under the divisional management.

As with any organizational structure, this DEM arrangement has both positive and negative aspects. It provides clear lines of accountability and communications. Successes or problems can be directly related to particular equipment and thereby be directly attributed to the responsible managers. The parallel technical sections provide certain competitive incentives. Fleet planning decisions are brought closer to the operational levels. Yet the centralized support services ensure more efficiency in certain functions.

On other hand, there is some duplication of functions; managers are generalists who handle everything for their fleets. There is little specialization in technical areas such as the preparation of procurement specifications. There is less flexibility in moving personnel and other resources among fleets to meet changing short-term priorities. There may be a tendency for problems to force their way up to the divisional management level before being resolved.

The overall assessment of the elevation of the equipment management program to division status is positive. A key factor is the strengthening of direct management control and accountability. With regard to internal organization, the assessment is less clear but also less critical. There

is no universally correct way to organize a fleet management operation. The success of an organizational structure is probably more affected by personal styles and institutional settings, that is, by what works best under a given situation. There may be some opportunity to make marginal improvements in performance through internal restructuring, but it is overshadowed by the potentials in other areas discussed below.

(b) Facilities and Equipment. The current need for a three shift operation clearly demonstrates that existing facilities are wholly inadequate. Although maximum usage of facilities and other capital investment occurs with around the clock operations, there are various inefficiencies; most notably, night shifts are less productive than day or evening shifts according to DEM data.

Various consultant studies have recommended expansions of repair facilities, resulting in two projects currently underway. A 1980 study on Ride-On operations by the consulting firm ATE, Inc. identified the need for a major bus repair facility. The December opening of the new DEM maintenance shop in Silver Spring will meet that need and should alleviate some of the problems with facility overcrowding. That facility was designed to be a modern, well equipped maintenance shop, with various specialized facilities, such as body repair bays and paint booths.

Although Silver Spring will presumably be less crowded after December, the Rockville depot remains inadequate to the task. Bay space is not sufficient to handle all operations in two shifts. Support facilities for employees are almost non-existent. Offices for management and support personnel are crowded and spartan. Exterior parking and storage areas are neither secure nor sufficient. Overall, it is probably more of a hindrance than a help to the DEM operation.

A 1983 study "Review of Equipment Management Facilities" prepared by the consulting firm Roy Jorgensen Associates determined that existing facilities were not adequate and recommended additional expansion. The construction of the new DEM maintenance shop in Gaithersburg will meet current needs as well as the projected increase in Ride-On operations. It also will include relocation of divisional headquarters. When that new facility is opened on schedule in FY 1986, it should resolve facility related problems into the foreseeable future.

Equipment generally appears adequate. The DEM maintains a full range of shop equipment, including computerized diagnostic equipment necessary for repair of late model automobiles and a machine shop that provides the capability to rebuild a variety of equipment components. As is industry practice, the DEM requires mechanics to supply their own hand tools, but it provides a small annual cash allowance for replacement costs.

(c) Personnel. The DEM depends primarily upon a skilled in-house work force. Labor costs are a substantial fraction of total program costs. Salaries and benefits represent over 36 per cent of all budgetted DEM expenditures (including capital outlays). The performance level of DEM personnel is probably the single most significant influence on the overall cost and productivity of the fleet. Successful management of personnel resources is argueably the most important factor in the DEM operation.

This evaluation does not address, however, two issues that are at the heart of personnel management: the appropriateness of the current position classification system and the comparability of County salary levels. The Personnel Department is currently concluding a major study of the County's blue collar work force that focuses on these two issues; it covers most of the DEM positions. That study systematically considers how labor and trades positions are classified and surveys the wage scales for comparable positions in the metropolitan labor market.

Without the final results of the labor-trades study, it would not be appropriate to evaluate either of these issues with respect to the DEM workforce in particular. This evaluation does consider, however, two related aspects of personnel management that potentially have a great influence on cost and productivity. The type and distribution of positions reflected in the staffing structure determine the available pool of skills and in-house capabilities. The use of compensation and other benefits as incentives directly affect the basic motivation for employee productivity, the ability to attract and keep qualified individuals and, of course, personnel costs.

(i) Staffing Structure The DEM work force consists of two distinct groups: shop personnel and support personnel. Shop personnel include all the 'wrench-turners' and others directly involved in vehicle repair; they are the staff of the three technical sections. The current complement is presented in Table IV. Support personnel includes everybody else: the DEM chief, administrative staff, and supply personnel. This group is shown in Table V.

In overall numbers, the DEM is currently running a low actual staffing level. Since December 1983, the vacancy rate has consistently been at least 10 per cent. That figure contrasts with a budgetted 2 percent lapse in personnel costs. This higher than planned vacancy rate results in a significant under expenditure on salaries and benefits. Although lower personnel numbers imply higher productivity levels, they also may result in a lower level of service.

The breadth of available shop skills is excellent. There are a wide variety of positions, which permits a good deal of specialization. The mechanic class includes automotive mechanics, heavy equipment mechanics, machinist-mechanics, apprentice mechanics and mechanic's helpers. There are also welders, auto body repairers, equipment operators, and service desk personnel. From the perspective of staff capabilities, there are very few, if any, repair and maintenance jobs that the County cannot perform in-house.

On the support side, there is not the need for as broad a variety of personnel. The range of administrative, managerial, and stock room skills appears quite appropriate.

The shop hierarchy is not particularly top-heavy, however, the distribution of employees by grade does not appear optimal. The current supervisory ratio is 1:5.7; and the typical first line supervisor averages seven employees directly with his span of control. These indicators are

TABLE IV
DEM SHOP PERSONNEL

<u>Grade</u>	<u>Position</u>	<u>Number</u>
<u>Supervisors</u>		
27	Equipment Manager	2
21	Shop Supervisor	3
19	Mechanic Leader	8
17	Mechanic III	4
13	Equipment Operator IV	<u>1</u>
Total Supervisors		18
<u>Tradesmen</u>		
17	Mechanic III	2
16	Mechanic II	46
15	Mechanic I	28
16	Autobody Repairer	4
16	Welders	2
Subtotal Journeymen (82)		
11	Mechanic (Apprentice)	3
9	Mechanic Helper	<u>8</u>
Total Tradesmen		93
<u>Other Staff</u>		
13	Motor Maintenance Dispatcher	4
12	Equipment Operator III	1
11	Equipment Operator II	2
7-9	Motor Pool Attendant I-II	2
6	Building Attendant	<u>1</u>
Total Other Personnel		10

TOTAL SHOP PERSONNEL 121

Workers:Supervisors - 103:18 (5.7:1)
Journeyman:Apprentices/Helpers -- 82:11 (7.5:1)

Data as of 7-7-84. Source: BUD 517

TABLE V
DEM SUPPORT PERSONNEL

<u>Grade</u>	<u>Position</u>	<u>Number</u>
<u>Supervisors</u>		
32	Division Chief	1
23	Program Manager	1
20	Automotive Supply Supervisor	1
15	Senior Stock Clerk*	4
Total Supervisors		<u>7</u>
<u>Stockroom Staff</u>		
13	Stock Clerk III	2
11	Stock Clerk II	8
9	Stock Clerk I	3
Total Stockroom		<u>13</u>
<u>Administrative Staff</u>		
21	Program Assistant II	1
12	Administrative Aide IV	1
11	Administrative Aide III	3
10	Office Assistant II	2
Total Administrative		<u>7</u>
TOTAL SUPPORT PERSONNEL		27

Workers:Supervisors 18:6 (3.1:1)
(ratio excludes division chief and two aides assigned to section chiefs).

*Note: The DEM considers this position to be a "working" supervisor, responsible for both providing services and supervising lower graded personnel.

Data as of 7-7-84. Source: BUD 517

within the range of generally acceptable supervisory levels and appear appropriate given the variety of shifts in operation.

Among the shop staff, however, the distribution of employees by grade is skewed toward the higher levels. The ratio of journeymen (grades 15-16) to helpers and apprentices (grades 9-11) is 7.5:1. This grade distribution results in large part because the DEM has an expressly stated preference for hiring fully trained mechanics with dealership experience. This result is less than optimal, however, because there may be frequent under utilization of highly skilled, highly paid journeyman workers.

A variety of tasks performed in the DEM maintenance shop do not require a journeyman's level of skill and knowledge. These include activities such as obtaining parts, shop clean up, minor tune-ups, oil and lube jobs, tire changing, and certain repair work. Due to the relatively low number of apprentices and helpers, only eleven over nine shifts, these tasks are often performed by regular mechanics. With a higher proportion of less skilled workers, those at the journeyman level could concentrate their abilities on work of appropriate level of complexity and difficulty.

There is another obvious advantage to greater use of apprentice mechanics and mechanic's helpers: cost. The typical DEM journeyman's salary (grades 15 and 16) currently averages \$21,950; the salary for a typical apprentice (grade 11) or helper (grade 9) averages \$16,450. With benefits, that differential exceeds \$7,000.

The support side has a well balanced distribution of employees by grade, but the supervisory ratio of 1:3 appears high. This high ratio is partly due to the parts supply operations, in which there are relatively few staff for the total number of shifts. An additional factor is the hierarchical structure of that operation, in which there are two layers of management (Automotive Supply Supervisor and Program Manager) in between first line supervisors and the Division Chief. This appears questionable for an operation that has only 13 workers and 4 first line supervisors.

(ii) Compensation and Incentives. The DEM management believes that the current County policy of providing a 2 percent annual salary increment does not provide an adequate rate of increase, particularly for younger, newer employees who are close to the bottom of the pay grade. There is a feeling that the current system of providing either cash bonuses for extraordinary performance or additional salary increments for sustained outstanding performance has not proven an acceptable approach to providing pay incentives. The DEM managers commonly express the belief that it requires too much documentation and paperwork to justify these awards, that the system is especially inappropriate for blue collar positions.

The DEM has also pushed for creation of an intermediate mechanic position description, one in between apprentice and journeyman levels (around a grade 13). Although various reasons are proffered for the creation of such a position, the primary purpose appears to be to create a mechanism (through promotional opportunity) to enable the DEM to award a larger pay increase (5%) to developing mechanics than the standard annual salary increment (2%). Personnel opposes this proposal because it violates the classification principles generally applied to trades positions.

These issues all reflect a basic belief on the part of the DEM that the compensation package it offers is not adequate to attract, retain, and motivate sufficient numbers of top quality automotive trades workers. There is some evidence in support. Personnel agrees that periodically, as market conditions change, it can be difficult to attract fully qualified mechanics. On the other hand, it is generally easy to attract helper and apprentice level applicants. Turnover among journeyman mechanics is sufficiently high that recruitment continues essentially on continuous basis.

This overall issue should be viewed in the context of compensation and incentives. The opportunity to earn more money on the outside is a reason frequently given for the inability to attract and retain mechanics. The flat rate system, commonly used outside of government for establishing mechanic's actual compensation, has strong built-in performance incentives.

Under a flat rate system, which is essentially a piece work pay scale, mechanics are paid based on the quantity of work performed, using a flat rate manual to determine the relative value of each job. Industry surveys indicate that under such a system mechanics may perform, and be paid for, as much as 12 hours of labor in a standard 8 hour shift. Because pay is directly linked to performance, there are strong incentives for increased productivity and employee retention.

Although such a compensation system may not be compatible with the County's mandated uniform pay scale, there are a number of available techniques that the DEM does or could apply to increase incentives. The DEM does not currently make substantial use of the existing system of performance based pay incentives. During FY 1984, only 12 per of all DOT cash awards and outstanding salary increments were given to employees of the DEM, although that division constitutes about 21 percent of the total DOT personnel complement.

The DEM has an established promotional track for mechanics. It hires some mechanics at the apprentice level (grade 11); these employees can be promoted to the journeyman level (grades 15 or 16) upon demonstrating their competence in all aspects of the job. At that time they receive an additional salary increase of at least 5 percent. Journeymen can compete for the limited number of Mechanic III positions (grade 17); and there are additional steps to Mechanic Leader (grade 19) and Shop Supervisor (grade 21). Each of these promotional opportunities results in an additional salary increment of 5 percent; however, there are relatively few of these higher graded positions and turnover is not as frequent. In theory, other automotive trades positions can have their own promotional ladder, but in practice there have not been a sufficient number of positions in other class series to establish them.

There are other possible incentives for improving performance. Although training per se cannot be used as a reward, the DEM can provide incentives for employees who voluntarily undertake training to improve skills and productivity. One idea under consideration is to encourage by paying for the costs of employees seeking the various certifications offered by the National Institute for Automotive Service Excellence

(NIASE). Non-pecuniary awards can also provide incentives. One example among the DEM activities is the division award to the DOT Operations depots (heavy equipment users) that keep the equipment in the best condition. That award has spurred competition among users; similar internal programs could provide incentives to shop personnel.

(d) Management Information Systems. The existing management information systems are clearly the most deficient element among the resources of the DEM. The current set up includes four completely separate computerized systems, none of which either communicate directly with each other or deliver information in a timely manner.

For a County that prides itself on maintaining a modern, efficient government, the current state of equipment management information systems is an embarrassment. The overall system is far from the state of the art; in some aspects the existing automated data processing capabilities do not perform as well as would a good manual system.

There is a low level of flexibility in analyzing and using the information. The systems involve substantial duplication of effort and require extensive delays for data processing that greatly reduce the utility of the information provided. Furthermore, the total cost to the county government of the four systems and related supporting activities appears comparable to what would be required to finance a state-of-the-art, integrated, on-line automated data processing system.

(i) System Integration. The four independent systems currently used by the DEM include: Mainstem, which processes fleet operations and maintenance data; MSA, which processes repair parts inventory data; Gasboy, which processes fuel consumption data; and FAMIS, which processes financial accounting data. There are no automated links between these four systems. This lack of integration causes of variety of otherwise avoidable problems.

One result of the lack of system integration is unnecessary duplication of effort. Certain work order data must be keypunched twice, for example, once for the Mainstem system and once for the MSA system. A closely related problem is the difficulty in achieving data accuracy. The more manual input required, the greater the probability of error.

Another shortcoming is the need for manual processing or special manipulation of data in one system to make it usable in another system. For example, certain data from the Mainstem system must be separately prepared and manipulated to develop the equipment rental rates that are entered into the FAMIS system. A tape of parts usage data from the MSA system must be prepared and shipped to New Jersey for use by Mainstem. Similar action must be taken to transmit Gasboy data.

These additional requirements for non-automated data preparation and processing both increase staff work loads and create problems with data errors, especially between the inventory and vehicle information systems. There have been problems with tape production and data reading. Editing of data is insufficient. The reconciliation procedures to identify and correct inconsistencies between data in the two systems are inadequate. The current level of coordination of resources between the DEM and the

Computer Center has not succeeded in minimizing production problems and turnaround times.

(ii) Timeliness. The computerized management information systems currently used by DEM are batch entry systems. Data is manually entered onto forms, which are batched together and shipped off to the appropriate servicing unit, where they are and keypunched at a later point. Data processing and report generation occur at discrete intervals. Report printouts are subsequently shipped back to the DEM for management use.

These steps all take time. Data turnaround ranges from three days for the daily inventory transaction reports to three weeks for the monthly Mainstem fleet reports. The result is that management information is not generally available in a timely fashion and becomes dated or unreliable before new reports are produced.

The DEM is consequently unable to make effective use of information. Management can not quickly get answers to questions. Unlike an on-line information system, the batch entry system does not permit direct inquiries to current data. Decisions must be held up or made on the basis of old or incomplete information.

(iii) Capabilities. The existing systems are limited in their abilities to manipulate and analyze data. Mainstem has certain pre-set report formats, which present data primarily from the perspective of various fleet groupings and vehicle component systems (i.e., brakes, electrical, etc.). These reports are adequate primarily for tracking major trends and comparing relative performance over time.

Any variations in Mainstem reporting formats or other data manipulation requires special handling. Mainstem can produce certain additional reports upon request at an additional charge. Alternatively, since Mainstem provides a copy of the computer data tape, the DEM can arrange separately through another private contractor or MS to perform the desired data processing (typically at a lower cost than the Mainstem charges).

Although such special analysis can be arranged, it requires additional time, staff resources, and expense. Such studies are done infrequently only on major issues such as overall fleet utilization or energy consumption patterns.

Even with special handling, many analytical functions can not be performed under the current set-up. Necessary data is not always gathered for or captured in the computer system. For example, no data is collected on the extent or causes of vehicle downtime; the DEM has not determined an appropriate definition for this key productivity factor. Although data is collected on time in and out of the shop, information which could be used as a proxy for downtime, it is not entered into the computer system. Similarly, come-backs can not be readily analyzed under the current system. Although data is tabulated on repeat work orders, no information is recorded on specific causes. Only an occasional manual determination is made, such as when there is a user complaint. No records are kept of the overall rates of particular quality control problems.

The internal structure of the information systems does not permit certain types of data analysis. Parts usage data can not be tracked by specific vehicle or fleet. Labor productivity can not be analyzed, except on a fleet basis. Exception reports are generated by using pre-established parameters, not statistical analysis. Work order analysis is limited to a few major factors, such as orders per unit or labor hours per order.

As a batch entry set-up, the existing information systems can not provide a variety of desirable functions that are feasible with an on-line system. The ability to generate and maintain work orders would provide clearer and more accurate hard copy for immediate shop use. It would eliminate the current need to physically store and manually retrieve work order paper copies. Work order and inventory records could be immediately updated when parts are withdrawn for a repair. Equipment history data could be immediately available to assist maintenance and repair decisions. Fleet inventory records and departmental billing information could be updated as changes actually occur. On-line inquiry capability would reduce the need for periodic reporting.

Inventory management functions would benefit from system enhancements, many of which are currently available (but not implemented) through the MSA purchasing and usage modules. Minimum inventory cost can be achieved by constantly monitoring actual stockage levels, demand histories, reorder points, average ordering delay, economic order quantities, etc. These inventory control factors should be calculated and revised regularly as usage patterns and fleet composition change.

Standard parts purchasing actions could be initiated and processed automatically. The system could identify needed items, determine the appropriate vendor and price, and generate a purchase order without human intervention. It could track actual deliveries, identify overdue orders, highlight emergency shortages, analyze and audit contractor performance.

(iv) Costs. The current cost for the Mainstem service bureau and other related data processing contracts totals \$72,000. This system serves exclusively the DEM and is included in its budget. The cost for the MSA inventory control system is \$52,000. It currently serves three DOT divisions, although the largest share of the costs is attributable to the DEM inventory because of the large number of line items and high volume of transactions.

If half of the MSA cost is allocated to the DEM, then the total annual expenditure on fleet management and inventory control information systems is currently approximately \$100,000. That figure represents the sum of money that could be redeployed to finance the operation of an integrated, state-of-the-art, on-line management information system.

These costs do not include any of the current systems development support from MS, none of which is charged back to any agency budget. In the event of going to an enhanced system, however, there would undoubtedly be additional MS costs related to acquisition and implementation, regardless of what type of systems is procured.

Expenditures on FAMIS and Gasboy are also not included in these costs. FAMIS is a County-wide system, which would not change on account of enhancements to the DEM computer systems. The Gasboy computer system is integral with its fuel dispensing hardware. It also would not change, however, any new DEM information system would necessarily include an automated linkage with Gasboy data files.

In the absence of a specific proposal for upgrading the existing management information functions, it is difficult to determine what the costs of a new system would be. Ballpark estimates of enhanced software are in the range of \$100,000 to \$200,000 initial cost and annual operating and maintenance costs in the vicinity of \$50,000 to \$100,000.

(v) System Enhancement. It appears almost self-evident that the DEM management information system is in need of enhancement. The current piecemeal approach does not produce data that is timely or adequate for making routine management decisions affecting a fleet of nearly 2,000 vehicles, a staff of 150, and a budget exceeding \$13 million.

Cost is not an issue. The potential savings from better management far exceed any estimates of system costs. The problem appears to be bureaucratic battling over whose approach to a solution is best. The situation cries out for a senior management decision on the appropriate approach so that efforts can be focussed on implementation.

3. Operations. The overall appearance of the DEM is of an operation that works. Equipment procurement seems to function well. Vehicles generally are purchased in a timely fashion. The DEM seems on average to be meeting the County's equipment needs. It also manages to provide a reliable supply of fuel. There are no reports of users unable to perform their essential missions because the right equipment or fuel was not available.

Shop operations appear to function at an acceptable level of effectiveness. For the most part, vehicles are being maintained and repaired successfully, although there are questions about the timeliness and quality of some maintenance work. As would be expected, users with lower overall priority have greater complaint than those from the highest priority fleets.

The DEM maintains a parts inventory of reasonable size, although it may be possible to further optimize this operation. Shortages contribute to excessive repair delays. Problems with inventory control seem related mainly to the antiquated management information systems. Some problems with maintaining current supply contracts have been identified.

(a) Equipment Procurement. The DEM demonstrates an innovative and flexible approach to the technical aspects of equipment procurement. It has taken various sensible risks, not all of which have worked out, but which collectively have resulted in significant savings for the County.

The major cost saving initiatives have been in the area of energy conservation. The DEM fleet downsizing program has successfully improved the overall average fuel economy of the County's administrative fleet. This program has now been extended into the public safety fleet. In the

heavy equipment fleet, the DEM has made a commitment to dieselization, which has both reduced energy usage and maintenance requirements. The resulting decline in fuel consumption has been approximately 8 per cent.

The energy conservation procurement initiatives have been strengthened by innovations such as incorporating lifetime fuel costs into the cost comparisons for vehicle purchases. Other steps have involved the procurement and installation of after-market energy saving devices. These include the Pass-Master (which reduces fuel usage when air conditioning is in use) and the Auto-Therm (which enables police officers to keep their vehicles warm without excessive engine idling). The implementation of the Gasboy system, while not directly saving fuel, has virtually eliminated discrepancies in accounting for consumption.

Even the DEM failures have been instructive. The conversions of heavy equipment to liquid propane fuel appeared cost-effective on paper, but the vehicles proved unsatisfactory in use. It confirmed the decision to go with dieselization. The initial downsizing of the police fleet resulted in the acquisition of a small number of vehicles that did not perform in an acceptable manner. Those cars have been assigned to other duties, so the investment was not lost; but the experience helped improve subsequent specifications that have been used to procure a more acceptable six cylinder police patrol vehicle.

Other innovative procurement practices have resulted in better equipment that is less expensive overall. The willingness of the DEM to issue bid requests for vehicles that include a variety of equipment options allows the County to make the most cost-effective purchases. It may require the DEM to do more analysis of vendor responses, but it allows the County to purchase only those options that are worth buying. The DEM has also made purchases of one year old rental cars for use as unmarked police and administrative vehicles. The substantial savings from eliminating first year depreciation appears to more than offset additional costs due to higher maintenance and shorter vehicle life.

With the purchase of heavy equipment, the DEM has been willing to take advantage of the guaranteed maintenance and repurchase option offered by some manufacturers. It also requires more analysis of vendor bids, but enables the County to purchase better quality equipment when it is cost-effective to do so. Although there are some complaints about the quality of heavy equipment, these appear more to reflect dissatisfaction with particular units than a problem with the DEM procurement approach.

In the transit fleet, the DEM has two noteworthy efforts. It has established a resident inspector program, which will contribute to higher quality control on equipment and presumably to fewer operational problems and lower lifecycle maintenance costs. The DEM has managed to purchase a standardized design of Ride-On buses (although two manufacturers are involved), which should result in lower parts inventory costs and higher labor productivity over the life of the vehicles.

The one area of concern is in meeting the specialized needs of administrative users. There seems to be a general sense among these users that particularly where rugged off-road conditions are encountered, the

DEM has not always responded with appropriate vehicles. Part of this problem seems to be the result of inadequate communication between users and the DEM concerning their specialized needs.

(b) Parts Supply. Some problems have occurred with maintaining appropriate stockage levels for various inventoried repair parts. There are also reports of excessive ordering delays for both inventoried and special order parts. Such outages and delays may contribute to some of the maintenance operational problems identified in the next section. Two factors appear primarily responsible for these problems: the inadequate management information systems and delays in contracting.

The current MSA automated inventory control system is in fact only an automated recordkeeping system. The key automatic purchasing and management analysis capabilities have not been implemented. Consequently, the parts ordering system is effectively an entirely manual process.

This situation is completely unacceptable for an inventory of 8,700 line items in two locations, valued at approximately \$730,000. The level of available staff resources do not permit the type of systematic review and analysis of inventory records and demand histories that enable management to optimize usage of this resource. It may result in both excessive inventory carrying costs and decreased efficiency of shop operations.

The financing costs of carrying inventory are not currently accounted for in the DEM budget, as the inventory technically belongs to the Finance Department. In terms of foregone interest, however, it represents a real cost to the County. With the size of the DEM inventory, the inability to optimize inventory activity may result in a loss of thousands of dollars in interest.

Delays in contracting also result in efficiency related costs. Due to a variety of factors: transitions in management of the Purchasing Division, changes in internal procedures, a backlog in work, and increased emphasis County-wide on contracting out for services; there have been problems in extending or rebidding a variety of parts supply and services contracts for the DEM. At one point earlier this year, nearly fifty such contracts had expired and were no longer in effect.

Under such circumstances, the DEM is forced to resort to buying parts on "call purchase orders," in which the Purchasing Division gives telephone approval for procurements of limited dollars and frequency. This procedure, intended for emergency situations, is inefficient, both in terms of requiring excessive staff time and limiting operational flexibility. It also may result in purchasing parts at prices higher than would be available under competitively bid supply contracts.

(c) Maintenance and Repair. Operation of the two maintenance shops (Rockville and Silver Spring) is the heart of the DEM. It occupies the largest share of personnel resources. It utilizes the bulk of fixed capital investment. It is the primary focus of management attention.

The performance of these maintenance and repair operations is fundamental to the success of the DEM. If the shops fail to perform effectively, the County's fleet would deteriorate; equipment would frequently be unavailable to users and prematurely become unusable. If the shops fail to perform efficiently, repair and maintenance costs would soar out of sight.

Overall indications are that the performance of the DEM maintenance and repair functions meets the County's basic needs. Most County equipment is routinely available for its intended use. It generally remains in service for the expected equipment lifetimes. As discussed in the subsequent subsection on financing, the bottom line quite favorable to the DEM. Equipment rental charges are relatively low.

Nevertheless, there are several areas in which shop performance clearly can be improved. Average vehicle downtime for certain sub-fleets is unacceptably high. Data on preventive maintenance levels indicates that more should be performed. Evidence as to rate of comebacks suggests that quality control is a problem. Labor productivity could be improved. Problems related to poor communication with users is evident.

(i) Downtime. The first observation about the problem of excessive equipment downtime is that no good statistical data currently exists. Available evidence, the informal logs kept by several user agencies, clearly suggests that there is a real problem. Average vehicle times in shop on the order of two to three weeks are unacceptably long for any sub-fleet, regardless of the user's relative priority.

Despite the clear evidence of an acceptable situation for some sub-fleets, the actual extent of the downtime problem is undeterminable. All agencies do not keep logs of equipment downtime. Those that do maintain records of uncertain accuracy and completeness. The DEM does not collect data, despite the capability to do so, on downtime per work order. The closest data that it does record, times in and out of the shop, is not entered into the management information system. As a result, the DEM has no systematic information about this key performance indicator.

Average vehicle downtime is an important factor because it relates directly to the total cost experienced by the County. Vehicles are a means whereby County agencies perform their functions. When vehicles are down for repairs and unavailable for use, any of the following additional costs may be incurred:

- (1) flat rate charge for replacement vehicle from the COB motor pool;
- (2) rental of replacement equipment from private vendors; or
- (3) loss of employee productivity.

These downtime cost factors represent real additional costs to the County and should be incorporated into the DEM decision-making process. The former two costs can be determined by a fairly straight forward calculation. The necessary expenditure data is currently collected; however the DEM must establish appropriate downtime records and modify its records to facilitate such a determination.

Productivity losses are much more problematical to determine. They very much depend on the particular circumstances associated with the downtime of a piece of equipment. If an employee is on leave when the vehicle is in the shop; or if another vehicle assigned to the agency is available due to employee absence, temporary vacancy or other factor; or if work assignments can be juggled; then there may be no real loss of productivity. On the other hand, if critical work assignments are delayed, or if otherwise avoidable complications develop, or if highly skilled employees are relegated to performing low level tasks, then there are real costs to the County from lost productivity. There needs to be an appropriate methodology for assessing those costs.

Due to the absence of downtime records, it is impossible to determine with any certainty what are the major causes of this problem. Although the DEM work orders may include information that would identify the cause of a delay (such as a note that needed repair parts were on order), none of this data is systematically collected or recorded. Some possible culprits that have been suggested include:

(1) Inadequate shop scheduling methods. The DEM currently schedules shop operations basically by the seats of its managers' pants. It sets priorities based on established County policy (i.e., public safety fleet first) and the judgment of its shift foremen/shop supervisors as to what needs to be done. The DEM does not employ any of the state of the art computerized shop scheduling software packages, which would systematize and optimize maintenance operations.

(2) Inappropriate workload management. The DEM needs to concentrate its resources on work with the highest net value. Journeymen mechanics should be devoted first to diagnosis and repair of complex problems; last to routine preventive maintenance and low-level helper tasks. If current staff or facilities are overburdened, then alternative means should be found to satisfy the lower value workload requirements.

(3) Unavailable repair parts. Alleged parts outages or ordering delays are an explanation commonly advanced for excessive downtime. Inventory management staff dispute this contention but, in the absence of appropriate records, the truth is not determinable.

(4) Poor contractor performance. Again a common explanation, both regarding repair services and parts or component vendors. It is also impossible to verify.

Only with adequate recordkeeping of the causes of excessive downtime be identified and the costs of potential solutions determined. As a basic management issue, the overall costs of current levels of vehicle downtime should be weighed against the costs of reducing that downtime. The DEM, which is an in-house service operation, should seek to minimize the total cost to the County rather than simply its operational budget.

There are trade-offs among various approaches. Maintaining larger numbers of vehicles in the motor pool is an alternative to more rapid shop turn-around time for administrative vehicles. A similar trade-off exists

between various levels of vehicle availability and concomitant user productivity losses. Such factors should be explicitly incorporated into the decisions made about the allocation of resources to and within the DEM.

(ii) Scheduled Maintenance. The Mainstem data is clear that overall the County fleet has not been receiving sufficient levels of scheduled maintenance. As of last spring, preventive maintenance was only at 70-80% of the recommended levels. The ratio of unscheduled to scheduled repairs was running at 4:1, which is considered very high. This problem has been recognized by the DEM management, with consultation from the Mainstem fleet advisor, and progress is being made.

Scheduled maintenance is particularly important to overall fleet performance. It performs a preventative function, prolonging equipment life, improving performance, and reducing the likelihood of unexpected breakdowns or failures. Scheduled maintenance allows mechanics to identify and repair minor or potential problems before they become major.

Significant long-term cost savings are possible from preventive maintenance. Data indicates that quality of repair work is generally higher on scheduled as opposed to unscheduled shop visits; there are fewer than half as many comebacks. Reductions in road calls can be accomplished through increased preventive attention. These save money both in terms of lower DEM operating costs (road calls are not a highly productive repair activity) and reduced user productivity losses (breakdowns are a severe inconvenience that interferes with performance of County functions).

Some fleets have demonstrated significant improvements in the rate of preventive maintenance. Mainstem data as of March indicated, for example, that increased progress on heavy equipment scheduled repairs had resulted in a decline in non-scheduled repairs. Other fleets have developed severe backlogs, notably Police patrol vehicles. The DEM management has made a commitment, however, to eliminating these scheduling delays.

Overall, the DEM needs to continue to place more emphasis on accomplishing scheduled maintenance. In the long term, increase in this area will lead to reduced demands for unscheduled maintenance.

(iii) Quality Control. As with the downtime problem, the DEM management information system provides inadequate data on the overall quality of maintenance and repair work. Mainstem data does include data on repeat work orders, which are primarily due to comebacks. Information is not collected, however, on the causes of these repeats; therefore it is impossible to identify specific deficiencies.

Two areas for possible improvement can be identified in addition to developing better data. More thorough oversight and road testing by shift foremen will catch some problems that would otherwise slip through. Greater accountability for comebacks can also reduce the rate. Current record keeping does not, however, facilitate the identification of mechanics responsible for higher numbers of repeat work orders. Such problems can only be identified through the general observations of supervisory personnel.

There is much anecdotal evidence from users regarding the quality control problem. There are indications that the DEM does not collect sufficient information from users concerning the symptoms and possible diagnoses of problems. Part of this problem appears to be related to the wide variations among users with knowledge about the operation of equipment.

Quality control is an issue that needs to be addressed for two reasons. Poor performance contributes to higher workloads from repeat work orders. It also leads to losses of both user productivity and morale from repeated attempts to obtain repair services.

(iv) Productivity. Overall labor productivity factors appear reasonably good. The Automotive Section operates with a vehicle to mechanic ratio of more than 40:1. The heavy equipment to mechanic ratio is 13:1 and the Transit Section ratio is 6:1. Work orders per mechanic-day, which is another productivity measure, are somewhat low, however. After accounting for holidays, leave, training and other non-productive time, the average mechanic completes only 1.8 work orders per work day.

The DEM has undertaken various efforts to develop higher levels of labor productivity. It developed preventive maintenance booklets and checklists to improve the uniformity and consistency of scheduled maintenance. It has instituted an Employee Safety Incentive program designed to reduce on the job accidents. Various technical training programs for mechanics have been conducted. Nevertheless, several systemic factors reduce the rate of improvement in labor productivity.

The three shift operation, although maximizing use of facilities and equipment, has two insidious side effects: the night shift has only moderate levels of productivity compared with the other two shifts; and each shift is only eight hours, which includes a paid meal break of thirty minutes, resulting in only seven and a half hours of productive work time. This arrangement was adopted because overlapping shifts also resulted in inefficiencies. The measurable loss of paid meal breaks, however, is six percent when compared to a standard eight and a half hour workday.

The DEM currently makes relatively little use of standard flat rate manuals for measuring employee productivity. There is little or no direct linkage between performance, productivity and wages (discussed previously).

(v) Communication. Several problems with shop operations appear attributable to poor communications with users. Users of equipment on time based scheduled maintenance have generally experienced little or no problem with information concerning these shop visits. Mileage based equipment users, notably police, have sometimes experienced problems determining whether preventive maintenance has been performed. The DEM is adopting a card notification method to rectify this problem.

A substantial problem exists with the determination of completion times on repair work. Scheduled maintenance that does not uncover additional problems is generally completed promptly. Repair work, however, may take weeks; and there is currently no system to project

estimated completion date. Furthermore, the DEM service desk personnel do not generally notify users of repair completion. Consequently, many users find it necessary to call the shop daily, sometimes for weeks, to check on the status of repair work.

These communication problems can be unproductive for all concerned. Some users may misschedule vehicles for preventive maintenance. Others waste time in constantly calling to check or repair status.

4. Financing. As an internal service fund, the DEM is expected to fully recover all its costs from charges to user agencies and other miscellaneous revenue sources. Since reorganization as a division, the Motor Pool Fund has not run a deficit, so the bottom line is that the DEM has been successful financially. Indeed, it has been too successful, and has actually accumulated annual surpluses averaging about \$1 million.

(a) Rental Rates. The DEM goes through an extensive cost allocation exercise to develop the flat rate and mileage rate charges. The theoretical basis for this procedure is very sensible. It assigns costs to the most appropriate factor, attempting to differentiate between those costs that vary with usage (mileage) and those that are fixed (flat).

The practical application of this system works well. The rates can be tracked against the various expenditure categories. For example, the FY 1985 rental rates for police vehicles include charges that total \$1.13 million fleet wide for replacement costs. The same budget includes a total of \$1.06 million for actual police vehicle replacements. That expenditure level represents 94% of the revenues collected, which is a reasonably close correlation.

Another application of the current rental rate system is in making decisions about vehicle usage policies. The case of police personal patrol vehicles (PPVs) is illustrative. Current County policy is to keep such vehicles in the fleet 54 months on average; the flat rate charge is \$240 per month and the mileage charge is 19¢. The rental rate structure allows the County to vary policy assumptions about vehicle life and calculate the consequences directly. Table VI shows four different PPV lifecycles and the resultant changes in costs.

This rental rate system has a related salutary effect. Agencies are charged the true cost of maintaining a piece of equipment. This pricing strategy forces County managers to carefully assess the need for each piece of equipment relative to its cost. Consequently, over the past several years, as most agencies have tightened up their budgets, many have reduced the amount of equipment assigned to them. The Highway Maintenance Section, for example, reports that it has turned in a variety of equipment because of the expense.

One side effect of agency equipment returns is that it places the DEM in an awkward position. First, changes in the size of the fleet can affect the DEM allocation of fixed costs through the flat rate charges in a given year. Second, the DEM has to consider the likelihood that the user agency may need the equipment again in another year; it may be more prudent to hold that equipment in surplus than to dispose of it by auction

TABLE VI
PERSONAL PATROL VEHICLE
(PPV) REPLACEMENT CYCLES

<u>Cost Factors</u>	<u>PPV Replacement Options</u>			
	<u>60,000 mi.</u> <u>3.2 years</u>	<u>70,000 mi.</u> <u>3.7 years</u>	<u>85,000 mi.</u> <u>4.5 years</u>	<u>100,00 mi.</u> <u>5.3 years</u>
Rental - Flat Rates- Mileage	\$290. 0.20	\$265. 0.21	\$240. 0.19	\$215. 0.19
Annual Cost/Vehicle	\$7,280	\$7,170	\$6,490	\$6,190
Annual Cost	\$2,897,440	\$2,853,660	2,583,020	\$2,463,620
Annual Replacement Requirements	124/yr.	108/yr.	88/yr.	75/yr.
Annual Replacement Costs	\$1,091,200	\$950,400	\$774,400	\$660,000

Baseline Assumptions: 398 PPV Vehicles
 19,000 miles - average annual mileage

Source: Automotive Equipment Section, DEM

or other means. These problems are both transitory, however, and should not persist now that agencies have trimmed out their vehicle fat, unless significant new budget pressures develop.

(b) Accounting. The DEM appears to be very conscientious in carrying out its accounting and auditing functions. It regularly audits all of its agency billings and disbursements, as well as monitoring contractor and vendor performance.

The DEM has demonstrated a strong concern for accountability through controls. All parts purchasing actions pass through several verification and review steps. Installation of the Gasboy system has virtually eliminated discrepancies in tracking the disbursement of fuels.

Nevertheless, the current system under which the DEM does its own accounting and auditing is most unusual for an activity that is not financed through an enterprise fund. There are a variety of potential internal controls through the other management information system, but then current piecemeal, batch entry operation precludes effective oversight.

(c) Expenditure Control. The DEM maintains exceedingly tight control over expenditures. On the capital outlay side, it does not replace even all of the equipment that it has determined is in need of replacement. On the operating side, the high vacancy rate results in an under expenditure of approximately 8% on personnel costs (almost \$400,000).

The result of these and similar policies is, of course, the large surpluses that the DEM has enjoyed over the past several years. The long term effect, however, is to unfairly penalize the user agencies by charging rates that are overall slightly too high and by providing service that is overall not as good as it could be.

VII. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis and findings of this evaluation, the following conclusions are reached and the associated recommendations are made for continued operation and improvement of the equipment management program:

1. The DEM is pursuing the most appropriate objectives in terms of meeting the County's vehicle and equipment needs at minimum total cost.

- Continue the currently stated goals and strategies for the DEM.

2. The experience of four years demonstrates that reorganization of the equipment management program has resulted in a higher level of management attention and a more successful operation overall.

- Retain divisional status for the equipment management program.

3. The need for additional shop space is critical. Its provision will contribute to further improvements in DEM operations.

- Maintain the schedule for the opening of the new DEM depot in Gaithersburg in FY 1986.

4. A continuous vacancy rate exceeding ten percent is too high. Either the DEM does not need the positions or it is not fully performing its functions.

- Reduce personnel vacancy rates or reexamine authorized budget levels.

5. Restructuring of the DEM staff will contribute to lower overall labor costs and higher productivity levels.

- Increase the proportion of lower graded shop employees. A better mix of skill levels in the shop will be more cost-effective.
- Increase the worker-to-supervisor ratio among support personnel. The current ratio appears to reflect excessive hierarchy.

6. Improving the opportunities for employee promotion, performance related compensation, and other awards will increase incentives for workers, reduce turnover rates, and result in higher productivity levels.

- Establish a multi-level mechanic apprenticeship program. Provide salary rewards through a highly structured training system, thereby permitting more rapid wage increases among newer employees, creating a taller career ladder, and focusing training on the DEM needs.
- Establish an enhanced performance based incentive pay system. Use productivity standards based on flat rate manuals, and directly link the quality and quantity of employee work to salary.
- Increase the proportion of DEM bonus money to a level comparable with the other divisions in DOT. Use these additional funds to pay for the enhanced incentive pay system.
- Establish additional incentive programs, including both individual programs, such as payment for NIASE certification costs, and group incentives, such as rewards for the most productive shifts.

7. The DEM badly needs an upgraded management information system. Delay is more costly than making a choice among the various proposed solutions. Enhanced capabilities will improve management decision-making capabilities and internal control functions.

- Make a decision on a technical approach to achieving an enhanced MIS function and proceed to procurement and implementation.
- Include the full range of data processing capabilities available in a state-of-the-art, on-line, integrated management information system.
- Provide auditing capabilities in the new MIS function to strengthen the current level of financial controls.

8. Current equipment procurement practices are innovative and result in overall savings to the County. Parts procurement and inventory control, however, do not function as effectively and efficiently as desirable; and equipment users do not bear the cost of carrying inventory.

- The DEM should continue to exhibit flexibility in its equipment procurement practices.
- Upgraded computerized information systems should include capabilities for automated parts purchasing and analysis of inventory utilization.
- Since the DEM is intended to be a self-supporting program, the Finance Department should charge the DEM for the interest lost due to capital tied up in carrying the repair parts inventory. This cost would be included in the overall DEM budget and ultimately be incorporated into the equipment rental rates.

9. The DEM maintenance and repair operations effectively meet the County's basic needs. Overall performance could be improved by reducing vehicle downtime, increasing scheduled maintenance, improving quality control on repairs, increasing labor productivity, and enhancing communications with users.

- Incorporate estimates of true total costs to the County, including vehicle downtime, in making decisions about enhancements to shop operations. Eliminate the double-charging of flat rates for pool vehicles used to replace assigned vehicles awaiting maintenance.
- Increase overall levels of scheduled maintenance to industry standards.
- Implement improved shop scheduling procedures, a function that can be tied in to an enhanced management information system.
- Explore contracting out the preventive maintenance of administrative and police vehicles. This action may prove to be a cost-effective way of reducing shop overload.
- Increase accountability of mechanics and foremen for the quality of repairs, increasing emphasis on checking completed work.
- End paid meal breaks on all shifts by changing to a part-time third shift of thirty two and one-half hours weekly (six and a half work hours per day plus one-half hour unpaid meal break). Since the night shift is least productive, the half hours added to both the day and evening shifts should produce more work than the current shift set-up; and the total cost will be less, with savings from reducing night shift hours equalling one and one-half paid hours per employee.
- Provide more regular communications with users at all levels, not just departmental fleet coordinators, including estimated completion times for repairs, notification of actual vehicle availability, and opportunities for complaints and comments.

10. The current system of equipment rental charges provides an appropriate basis for management decisions on vehicle resource allocation among County programs. Nevertheless, the current rental rates have been consistently generating excessive levels of surplus, artificially penalizing programs that are more dependent upon equipment usage.

- Retain the current rental rate structure, updating and revising as necessary to eliminate future deficits or surpluses.
- Devote the current surplus to replacing marginal equipment and to making investments that will upgrade overall shop performance and hold down future costs.

VIII. EXECUTIVE BRANCH COMMENTS

Before submitting this report to the County Council, a draft copy was sent to the affected departments mentioned in the report. Comments were only received from the Department of Transportation. Those comments are included in their entirety on the following pages.

1. Comments from the Director, Department of Transportation.

The report is detailed, complete, and lists description, organization, reaction of user agencies, analysis and findings, etc. The report lists several opinions of other agencies, which are subject to clarification and debate. Rather than addressing every issue or claim made in the report, we believe that the author summarized the crux of his findings in Chapter VII entitled Conclusions and Recommendations. I believe it will be prudent to address the critical issues listed under this heading on pages 41, 42, and 43.*

1. OBJECTIVES

- Our cost data reflects this to be a factual statement. Cost comparisons on various units of heavy equipment reflect that rental rates charged by Division of Equipment Management are almost 1/3 less than commercial rates for like units of equipment.

2. ORGANIZATION

- The divisional status did achieve fleet specialization by function. A further refinement of reorganization is in progress, i.e., reallocation of duties and responsibilities of key personnel.

3. SHOP FACILITIES

- The Equipment Maintenance and Operations Center at Gaithersburg is scheduled to be completed in December 1986 (FY'87). The Bus Maintenance Facility at Brookeville Road is scheduled for completion in March 1985. The Bus Maintenance Facility project experienced a 3 month delay due to prime contractor facing unusual sub-contractor problems. The comment pertaining to critical need for additional facilities is valid and we are conscious of its impact on the fleet and ultimately efficiency of the County Government.

(*Note: In the final report these issues appear on pages 47-50.)

4. VACANCY

- The report conclusions and recommendations (page 41) suggests that DEM reduce vacancy rates or reexamine authorized budget levels. As of November 1984, the vacancy rate is 16%; however, 1/2 of the vacancies have a six (6) month salary lapse. Those positions are additional positions that were justified by the Ride-On expansion to commence January 1985.
- The recruitment of qualified mechanics has been a constant problem. I am sending a copy of this document to the Director of Personnel to develop an upward mobility program for mechanic helpers and apprentice mechanics. An in-house training program will alleviate some of the recruitment problems.

5. ORGANIZATION RESTRUCTURE

- Senior Stock Clerks on Table V, page 49, have been included as supervisors. The Senior Stock Clerks are working supervisors, mainly supervising a functional activity. In any event, the proposal deserves further merit and consideration and we shall evaluate it.

6. PERSONNEL ISSUES

- The promotion and compensation aspect deal with personnel issues within the Division. Establishing a multi-level apprenticeship program will require coordination, assistance, and approval from the Personnel Department.
- Payment to employees based on an incentive system as currently practiced in the industry and adopting this in the County will require a total change from the current established County compensation practices and also requires input from the Personnel Department.
- Increased awards for performance will be recommended.
- Payment for certification will require the approval of the Division of Organization and Training of the Personnel Department.

6. PERSONNEL ISSUES, (CONT.)

- Again, I will be referring to the Personnel Department for their input into these issues.

7. MANAGEMENT INFORMATION SYSTEM

- The author has highly emphasized a lack of appropriate information on tools available to the Division and labeled this as the most deficient aspect of the Division. The decision on the system has been made and jointly agreed by Director, Department of Transportation; Director, Department of Finance; and Director, Office of Management & Budget. The proposal has been approved by the Chief Administrative Officer. The agreed upon decision is as follows:

To prepare RFP for an integrated vehicle management system to include vehicle management, fuel system, and inventory control. This will result in abolishment of existing MSA inventory control system.

The system will be operated on mainframe computer with operating terminals at the Division of Equipment Management facilities. I share the critical need for a workable and efficient information system and have advised the Division of Equipment Management and Management Systems of OMB to give this project priority. The RFP is scheduled to be completed in January 1985.

8. INNOVATIVE PROCUREMENT PRACTICES

- The purchase of diesel fuel under an innovative contract and purchase of used cars under yearly contract are examples of effective procurement at the Division of Equipment Management.

8. INNOVATIVE PROCUREMENT PRACTICES, (CONT.)

- The specifications for computerized information system is currently under progress and capability relating to analysis of inventory utilization will be included in the scope of services.
- As for the Finance Department charging interest to Equipment Division for inventory, this issue will require further clarification from outside auditors. The central inventory fund is under the jurisdiction of the Finance Department and Division of Equipment Management acts as a custodian for this fund. The parallel to this situation would be Department of Finance reimbursing Division of Equipment Management the investment income on its retained earnings or fund balance at any given time. This type of chargeback may cause audit complications and net benefit may not be worth the effort.

9. OPERATIONAL ENHANCEMENTS

- The new information system specifications will include appropriate measures to check employee productivity, vehicle downtime, quality of repairs, etc., on an on-line basis. The rental rates are based on yearly expenditure level for a class of fleet and not on a per vehicle basis.
- Comment pertaining to improved scheduling will be an integral part of the proposed vehicle management information system.
- In regards to other comments pertaining to quality of repairs, shift scheduling, and user communications, several improvements have already been effected and others are awaiting completion of facilities.
- Some of the problems relating to priority in repair and maintenance of administrative fleet need further clarification.

9. OPERATIONAL ENHANCEMENTS, (CONT.)

- The report was initiated in June 1984. At that time, DEM was experiencing an unprecedented backlog of equipment awaiting repairs and in process. The backlog was primarily due to a decision by the Chief of Police to initiate disciplinary action against officers who did not bring in their vehicles within the 5,000 mile parameter. Since the public safety vehicles have priority repairs, much emphasis was placed on meeting the goals of the Police to include extensive overtime from the end of June until early August 1984. Since the administrative vehicles had secondary priority, this fleet had to suffer a degree of consequence.
- A second source of the problem was adequate funding for replacement administrative vehicles (please refer to the FY'85 budget request for capital outlay for the administrative fleet). In FY'82 through FY'84, only 20.4% of the administrative fleet had been replaced (low of 2.7% in FY'83). In contrast, the administrative fleet, with a useful life of seven years, should have been replaced at the rate of 14.3% per year (42.9% for three years). The intent of this analysis is to emphasize the importance of a timely replacement program and the consequences of deferred capital outlay.
- The Division of Equipment Management has proposed reallocation of duties and responsibilities of certain key individuals to avoid redundancy in duties and responsibilities. This action, which is temporarily in effect now, has already improved communication with user agencies and reduced downtime on vehicles and equipment. Concurrently, there are several major internal changes pending completion of the Bus Maintenance Facility at the Silver Spring depot. These include, but are not limited to, relocate all auto, truck, and bus body operations to the Silver Spring shop, centralize major machine shop operations, initiate the concept of fast service lane, review the possibility of shift patterns at Silver Spring and Seven Locks, etc. We are confident that these changes will fine tune the operations and will result in improved performance and communication.

10. EQUIPMENT RENTAL CHARGES

- The latest report from the Office of Legislative Oversight on chargeback systems in the County reflects that Motor Pool fund with its current rental rate system is one of the most effective chargeback systems in the County Government. The rental rates are scrutinized once a year and we shall continue to maintain a viable system.
- The comment pertaining to devoting current surplus to replace capital equipment is valid and is in progress in varying degrees. Last year, we purchased 24 additional vehicles for the Police Department. FY'86 budget allocates a significant portion of retained earnings to fund the budget. It is critical that we continue to replace equipment in a timely manner to update the fleet to a modern and maintainable condition.

SUMMARY

The Department of Transportation would like to extend our appreciation for providing a detailed report reflecting intricacies dealing with production, personnel, financial and management approaches to problem solving. The report reflected a complete management audit of the Division. The report conveys an understanding of the operations and the job was performed in a professional and constructive manner.

Encl: (1)

cc: William P. Garrett, Personnel Director