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P-313

Honorable Art Agnos, Chairman
Joint Legislative Audit Committee
State Capitol, Room 3151
Sacramento, California 95814

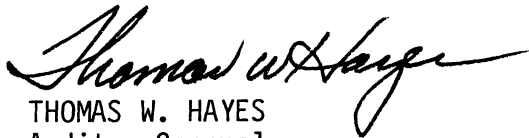
Dear Mr. Chairman:

This is our briefing document on the State Department of Transportation's Equipment Management System. The document discusses the problems encountered by the department in developing a computerized system to manage the department's fleet of approximately 12,000 vehicles.

We have discussed the contents of the briefing document with the requester, Senator Leroy Greene. Based upon our discussion with the requester, we are not planning further work in this area.

The auditors who worked on the job are available to meet with you to discuss this document.

Respectfully submitted,


THOMAS W. HAYES
Auditor General

Attachment

cc: Each Member of the
Joint Legislative Audit Committee

EQUIPMENT MANAGEMENT SYSTEM
STATE DEPARTMENT OF TRANSPORTATION
BRIEFING DOCUMENT

I. BACKGROUND

- A. The Division of Equipment Maintenance and Development (Division of Equipment), a unit of the State Department of Transportation (department), is responsible for the department's fleet of approximately 12,000 passenger vehicles, trucks, and specialized highway maintenance and construction equipment.
1. The Division of Equipment's responsibilities include the following:
 - a. Managing the fleet;
 - b. Coordinating equipment purchases;
 - c. Designing special equipment and components; and
 - d. Repairing approximately 12,000 vehicles.
 2. The Division of Equipment's budget for fiscal year 1982-83 is \$85,766,000.
- B. The Office of Computer Services, a unit of the department, provides computer support for the department. Its current responsibilities are to design, write, maintain, and operate the department's computer programs and systems.
- C. To assist its management of the department's fleet of vehicles, the Division of Equipment purchased a computerized equipment management system in 1979.
1. The purpose of the equipment management system is to assist the Division of Equipment in controlling the quality and costs of maintaining the department's fleet of approximately 12,000 vehicles.
 - a. Types of information collected for the equipment management system include the following:
 - (1) Costs to repair a vehicle (number of labor hours, and cost of labor and parts);

- (2) Reason for the job (accident, wear and tear, breakdown, etc.);
 - (3) Vehicle repaired;
 - (4) Type of work performed (engine, brakes, etc.);
 - (5) Mechanic who performed the work; and
 - (6) Cost of commercial repairs.
 - b. The equipment management system is designed to provide the following information on fleet management:
 - (1) Cost analysis;
 - (2) Utilization of the fleet;
 - (3) Replacement data;
 - (4) Preventive maintenance;
 - (5) Historical record of repairs; and
 - (6) Mechanic productivity.
2. The equipment management system is needed to provide the Division of Equipment's management with factual, supportable data to make decisions.
 - a. The need for an equipment management system became critical for the Division of Equipment after the department eliminated the Division of Equipment's cost accounting system in 1980, leaving it with no cost data for management purposes.
 - b. The Federal Highway Administration reported that an equipment management system may save a state millions of dollars annually.
 3. The department's internal audit unit identified several problems within the Division of Equipment that an equipment management system would correct. For example, the Division of Equipment lacks information needed to make economic replacement decisions or to develop practical standards or norms for fleet management.

4. A large fleet operator, Pacific Telephone and Telegraph Company, reported that its equipment management system resulted in substantial improvements in its fleet management, including reduced repair costs.

II. SCOPE AND METHODOLOGY

- A. We reviewed the department's activities related to the purchase and implementation of the equipment management system.
 1. At the Division of Equipment, we reviewed the following documents:
 - a. The feasibility study for an equipment management system;
 - b. The contract with the vendor to purchase the equipment management system;
 - c. The report to the Federal Highway Administration on the development and implementation of the equipment management system; and
 - d. A recent audit report by the department's internal audit unit on the equipment acquisition and fabrication at the Division of Equipment.
 2. At the Office of Computer Services, we reviewed the following documents:
 - a. The work schedule for implementing an equipment management system;
 - b. Cost report for the equipment management system; and
 - c. Correspondence pertaining to the equipment management system.
 3. We interviewed appropriate department officials at the Division of Equipment and at the Office of Computer Services.
- B. To obtain information on other equipment management systems, we interviewed fleet managers at two organizations to determine the need for a system, the problems encountered in implementing these systems, and the benefits of these systems:

1. Pacific Telephone and Telegraph Company - 24,000 vehicles;
and
2. Sacramento Municipal Utility District - 1,000 vehicles.

III. COST OVERRUNS AND DELAYS IN
DEVELOPING THE EQUIPMENT
MANAGEMENT SYSTEM

- A. When the equipment management system is fully implemented by April 15, 1984, the department will have expended approximately \$1,128,000 to develop its system. The department will have expended approximately \$653,500 more than the original estimate of \$474,500.
1. Based on the February 1979 contract between the Federal Highway Administration and the department, the original cost estimate for the equipment management system was \$474,500. The original cost to develop the system was shared between the Federal Highway Administration (\$121,250) and the State (\$353,250).
 2. When the system is implemented, the department will have expended approximately \$1,128,000, consisting of approximately \$960,000 for costs through May 1983 and another \$168,000 to complete implementation through April 1984.

TABLE 1

EQUIPMENT MANAGEMENT SYSTEM
DEVELOPMENT COST INCURRED BY THE
STATE DEPARTMENT OF TRANSPORTATION

	<u>Estimated Cost through 5/83</u>	<u>Estimated Cost to Completion (6/83 to 4/84)</u>	<u>Estimated Total Cost of Development</u>
Office of Computer Services	\$421,000	\$125,000	\$ 546,000
Division of Equipment	<u>539,000^a</u>	<u>43,000</u>	<u>582,000</u>
Total	<u>\$960,000</u>	<u>\$168,000</u>	<u>\$1,128,000</u>

^a Includes the purchase price of \$133,000 for the computerized equipment management system.

- B. The original completion date for equipment management system was February 1981 (based on the contract for development between the Federal Highway Administration and the department).
- C. The department estimates that the equipment management system will be completely implemented by April 15, 1984, 38 months after the original estimated completion date of February 1981. After April 1984, the department will continue to modify the system for report revisions, preventive maintenance, and immediate access (on-line) to the data by district offices.
- D. Without a completely operational equipment management system, the Division of Equipment lacks information to make management decisions based on factual, supportable data.
 - 1. Example - The Division of Equipment cannot determine the optimum level of preventive maintenance for the purpose of minimizing costs, reducing downtime, and extending vehicle life. Preventive maintenance is the routine performance of tasks related to vehicle lubrication, inspection, adjustment, and repairs. Performing excessive preventive maintenance results in unnecessary repair costs and downtime, while inadequate preventive maintenance results in unnecessary breakdowns of equipment and excessive wear and tear on equipment.
 - 2. Example - The Division of Equipment cannot evaluate employee efficiency by comparing the standard time needed to perform a task to actual time taken.
 - 3. Example - The Division of Equipment cannot monitor equipment usage to identify the reasons for underutilization.
 - 4. Example - When purchasing new equipment, the Division of Equipment cannot evaluate design strengths and weaknesses of various makes and models of equipment based on department experience.
- E. There are two principal reasons for the cost overruns and delays in implementing the equipment management system:
 - 1. The Division of Equipment conducted the feasibility study, evaluated various computer proposals, and selected the vendor. The Division of Equipment relied on its project coordinator because the Division of Equipment believed he had the necessary

computer expertise. However, the department officials now believe that the Division of Equipment lacked the computer expertise to evaluate computer systems and qualifications of the vendors. The department has taken corrective action by adopting a policy requiring the Office of Computer Services to be involved in future purchases of computer systems. Specifically, the policy states that "the Office of Computer Services has the primary role in selecting the vendor software packages, developing the contract, and managing the approved contract."

2. Department officials stated that the selected vendor delivered a deficient computer program.
 - a. The vendor's 165 computer programs were new and untested. The system had not been "debugged," and it contained substantial errors.
 - b. The vendor's computer programs processed the data inefficiently.
 - c. According to the vendor, the equipment management system was a new system and the computer programs did contain some errors.
 - d. The Office of Computer Services is correcting the deficiencies in the computer programs for equipment management system.
 - (1) The Office of Computer Services' officials believe that correcting the original equipment management system is preferable to developing a new system because of the cost and time required.
 - (2) The Office of Computer Services assumes complete responsibility for changing the vendor's computer programs because the Office of Computer Services believes it could complete the corrections faster and better than the vendor.
 - e. The department's Legal Division reviewed the vendor contract and subsequent events to determine if it would be appropriate to take legal action against the vendor. The Legal Division concluded that the legal expense involved would probably far exceed any return that the State might obtain by settlement or as a result of a trial. Further, legal action was not appropriate because the vendor was fully responsive to the department in correcting the deficiencies in the equipment management system.

IV. THE DIVISION HAS NOT IDENTIFIED SPECIFIC USES FOR THE EQUIPMENT MANAGEMENT SYSTEM AND THE TYPES OF REPORTS NEEDED

The equipment management system will produce reports that may not be useful to the users of the system. This may result in ineffective and inefficient operation of the department's approximately 12,000 vehicles.

B. Potential users of equipment management system include the following:

1. Division Chief;
2. Staff managers at division headquarters;
3. Shop superintendents;
4. Shop supervisors (foremen);
5. Mechanics; and
6. Other department personnel including those in accounting, budgets, and district operations.

C. The equipment management system is capable of generating numerous reports for various purposes in various formats. For example, reports can be generated by the following:

1. Shop location;
2. Type of vehicle (truck, sedan, etc.);
3. Individual vehicle;
4. Make of vehicle (Ford, Dodge, etc.);
5. Type of repair;
6. Costs of repairs;
7. Labor costs; and
8. Parts costs.

D. Each of the various users of the equipment management system may have different needs for information.

1. Example - Management of the Division of Equipment needs summary information on the department's approximately 12,000 vehicles.
 2. Example - A shop mechanic needs detailed information on a particular vehicle.
 3. Example - A shop supervisor needs information on vehicles that mechanics under his control are repairing.
 4. Example - A shop superintendent needs information on all vehicles under the shop's jurisdiction.
- E. The Division of Equipment has a general idea of the type of information needed from the equipment management system. However, the Division of Equipment has not developed specific uses for each level of user.
- F. The Office of Computer Services has requested that the Division of Equipment not provide information on its informational needs until the Office of Computer Services completes its correction of the data base.
- G. To obtain information on what users of the equipment management system need, the Division of Equipment plans to consult with potential users on specific uses for the system for each level of user. The Division of Equipment will send information about its specific needs to the Office of Computer Services.