Abridgment

Maintenance Planning for Small Transit Systems

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Vehicle maintenance in most transit systems follows a fixed routine of daily inspection and service, which includes fueling, cleaning, and washing. Bus operators are often required to check various systems on the bus before they leave the storage garage and to report any malfunction or suspicion of problems. Additional inspection and service is also undertaken at various intervals by mechanics, who then correct the problems discovered. As the interval between inspections increases, the inspection covers a greater number of systems and component units (1).

TRANSIT BUS MAINTENANCE FACILITY

A complete maintenance facility for a transit bus consists of a storage garage; a service area for daily fueling, cleaning, and inspection; a periodic inspection area; a bus repair area; and a component unit repair and rebuild facility. The component repair and rebuild facility is often subdivided according to the types of systems (for example, electrical systems are often housed together). Special areas are also devoted to engine and engine components and transmission and brake rebuilding. In addition, a body shop and an interior repair work area are often included in the bus maintenance facility (2).

Transit Bus Maintenance for Small Systems

Large transit systems can justify the costs of a complete maintenance facility, but smaller systems do not have the same advantage. Most small systems, because of the low volume of repairs, acquire segments of the maintenance facility but depend on outside sources to handle the majority of their maintenance work needs. The size of the property (as reflected in the number of buses it operates) dictates the size and shape of the maintenance facility. The smaller the size of the fleet, the smaller and more limited the maintenance facility and the more the system will depend on outside sources for maintenance. This study focuses on the small systems, which are often neglected in discussions of transit maintenance.

Small Transit Systems Under Study

This study, conducted in 1976, focuses attention on two small transit systems in the state of Wisconsin—the Bell Urban System (BUS), which serves the Racine area, and the Sheboygan Transit System, which serves the city of Sheboygan and some of the surrounding communities. The study deals with the current maintenance facilities and procedures, as well as with expected future needs.

A review of available maintenance reporting and planning systems such as the Service, Inventory, and Maintenance System (SIMS) (3) and BUS (4) reveals that such systems could not be supported efficiently in small transit systems.

FEATURES DESIRED IN THE MAINTENANCE PLANNING SYSTEM

Maintenance work, particularly that of a less frequent nature, requires evaluation of the necessary tasks and the proper allocation of these tasks to sources inside and outside the transit maintenance facility. The allocation process should capitalize on the attributes of the available internal and external resources.

Several areas should be looked into in the evaluation of possible outside vendor services. Balancing service time, repair quality, and cost of repair are among the factors to consider when work is contracted to outside vendors.

Adequate communication is necessary between the system and outside vendors. The vendor should be informed of the particular problems on the bus and may also be provided with a short history of previous work completed on the bus. The vendor, in turn, should provide the transit system with the necessary information to update the bus file. When information is uniformly dispensed and received, the transit system can control the maintenance process and associated costs.

Accurate quality-control records can reduce the transit property cost and improve both in-house and vendor maintenance services through auditing and controlling the quality of these services. If records of various maintenance costs and projected expected maintenance requirements are maintained, transit management can evaluate the need for expansion of their maintenance facilities by the addition of a particular service or facility.

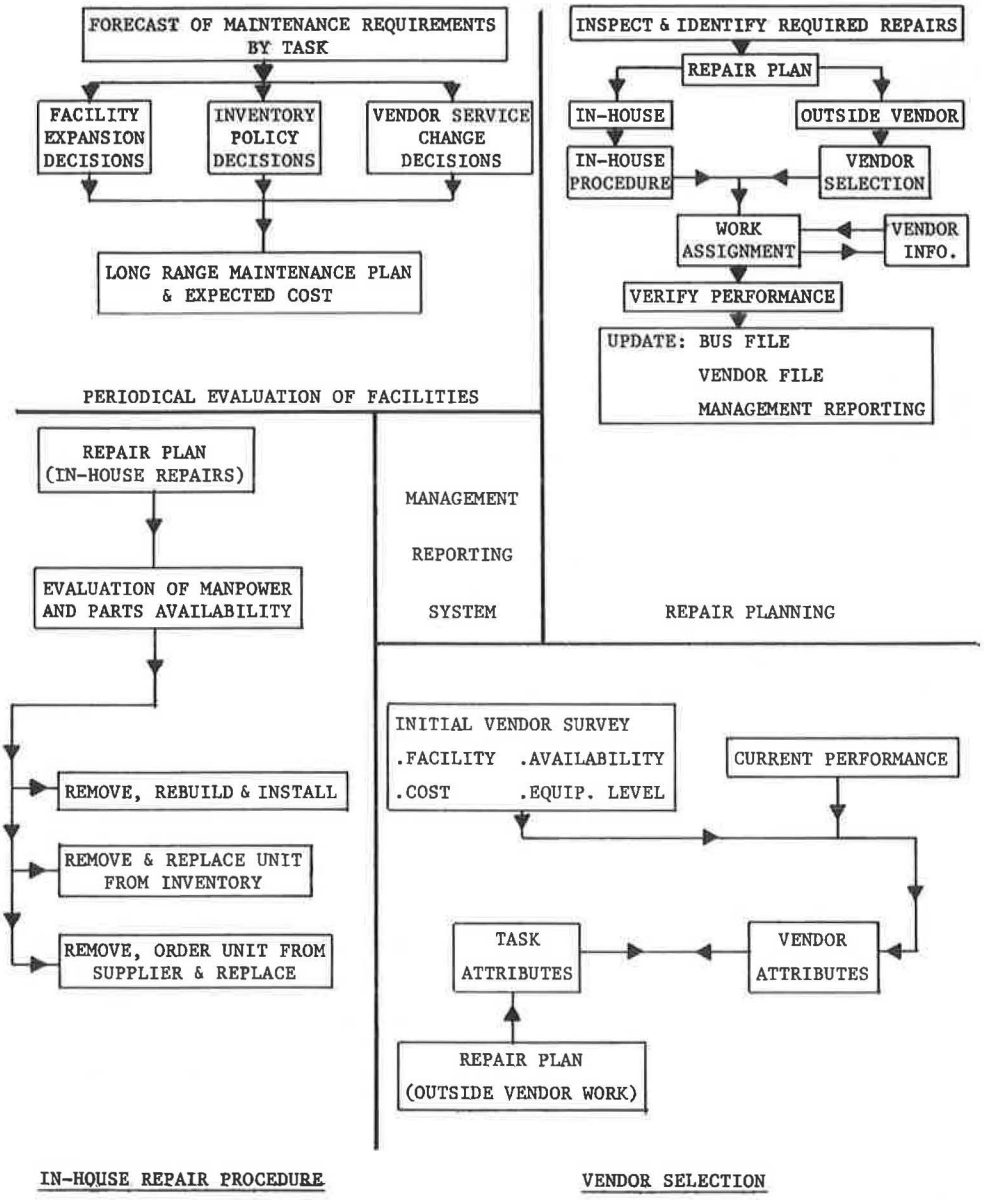
Maintenance cost can be reported in various degrees of detail according to management needs. Costs reported by vehicle are used for replacement decisions; costs of emergency repairs are useful to the evaluation of a preventive maintenance policy. Costs reported by various maintenance activities are helpful in pinpointing productivity and performance quality problems. In addition to the previous reports, small transit management would be interested in the cost of outside services, performance of the vendor, and the cost of spare parts inventory.

Figure 1 shows the main components of the desired system for maintenance planning. The proposed system could be applied in a manual fashion or by the use of a small computer, in which case it may be integrated in the total management information system.

REFERENCES

1. M. M. Bakr and S. L. Kretschmer. Scheduling of Transit Bus Maintenance. Proc., ASCE, Transportation Engineering Journal, Vol. 103, No. TE1, Jan. 1977.

Figure 1. Components of a system for maintenance planning.



2. H.J. Glueckstein. Maintenance Facilities Planning: Milwaukee County Transit System Main Shop Analysis. Mimeograph, May 1976.
3. R.L. Scott. SIMS Implementation Handbook. Urban Mass Transportation Administration, Rept. UMTA-VA-06-0004-75-1, Dec. 1974.
4. D. Robey and M.M. Bakr. Factors Influencing the Adoption of Management Innovations at the CTA. May 1977. NTIS: PB 266 154.

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