



Preventive Maintenance for Local Government Buildings: A Best Practices Review

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This review recommends best practices in managing preventive maintenance for buildings, and it profiles local jurisdictions currently using them.

*For the full best practices report *Preventive Maintenance for Local Government Buildings* (#PE00-06), call 651/296-4708 or download from:

www.auditor.leg.state.mn.us/ped/2000/pe0006.htm.

This best practices review identifies seven strategic practices for effectively managing preventive maintenance of school district, city, and county buildings. The report recommends that local governments adopt these actions wherever appropriate.

Recommended Best Practices:

- Building managers should inventory building components and inspect their condition (p. 13 in the full report*).
- Building managers should set priorities among maintenance projects and evaluate projects' lifetime costs (p. 20).
- Local jurisdictions should plan and budget strategically for preventive maintenance in the long- and short-term (p. 29).
- Building managers should structure a framework for operating a preventive maintenance program, including checklists of preventive maintenance tasks (p. 43).
- Building managers should use tools, such as work-order systems, to optimize their preventive maintenance program (p. 57).
- Local jurisdictions should ensure that maintenance employees have

appropriate training to competently complete their tasks (p. 69).

- Local officials should involve appropriate maintenance personnel when designing space and purchasing building components. Building managers should educate policy-makers on building needs (p. 75).

In addition to recommending these best practices, the review found that:

- Well-planned preventive maintenance extends the useful life of building components such as roofs or heating and ventilation systems, thereby preserving taxpayer investments (p. 5).
- Although most Minnesota local governments report that they perform some preventive maintenance on their buildings, only about 15 percent have a comprehensive preventive maintenance program (p. 83).
- School districts with comprehensive preventive maintenance were more likely than other districts to report having most facility components in good condition (p. 84).
- Local governments reported that the greatest obstacles to preventive maintenance are competition for limited dollars, insufficient staff hours available, and levy limits (p. 90).

Preventive maintenance extends the useful life of building components.

Report Summary:

Preventive maintenance is regularly scheduled repair and maintenance needed to keep building components, such as heating-ventilation-air-conditioning (HVAC) systems, roofs, plumbing, and electrical systems, operating efficiently and to extend their useful life. Preventive maintenance includes periodic inspections, lubrication, calibrations, and equipment replacement. Replacing filters in an air-handling unit on a regular basis is an example of preventive maintenance.

Effective preventive maintenance is a planned approach designed to avoid equipment breakdowns and prevent minor problems from escalating into major ones. By contrast, emergency and corrective maintenance occur when equipment fails, typically requiring more time and resources to correct problems.

Local governments should follow seven best practices for effective preventive maintenance.

1. Inventory Building Components and Assess Their Conditions

Before beginning preventive maintenance, building managers should inventory building components and their condition. Information on conditions helps identify needed maintenance. About 47 percent of Minnesota school districts (144 districts) reported in a 1999 survey that they keep a current list of most of their building components. Responding to a slightly different question, 24 percent of cities and counties (68 jurisdictions) reported they had an inventory of most of their building components' condition.

To control costs of assessing conditions, building managers should plan which building components to assess and how much to use experts with special diagnostic tools. For comparable data, building managers need standard assessment methods and trained workers.

Example: Hennepin County's Property Services Department requires ongoing inspections. For instance, building managers follow a roof inspection checklist twice a year looking for blistering, plugged drains, or damage to caulking. Every five years, consultants scan the roofs with infrared imaging equipment. Condition information allows estimating life expectancies for roofs and planning their maintenance.

2. Build the Capacity for Ranking Maintenance Projects and Evaluating Their Costs

Because the need for maintenance can outpace available resources, building managers should use an objective process to set priorities among projects. About 58 percent of school districts (162 districts) indicating they perform preventive maintenance had a ranking process.

To make cost-effective decisions between replacing or continuing to maintain building components, building managers should use an evaluation tool, such as life-cycle costing. For reliable cost estimates, local officials should use standardized cost guides, contractors' estimates, or their own historical repair data. About 22 percent of school districts (60 districts) reported that they determined life-cycle costs for most components.

Example: The Anoka-Hennepin School District Buildings and Grounds Department developed a guide to estimate costs for maintenance projects common in the district's 43 buildings. The guide includes estimates for both labor and supplies, which are based on the district's historical cost data and updated yearly. It provides accurate data and avoids duplicating estimates for similar repairs.

3. Plan Strategically for Preventive Maintenance in the Long- and Short-Term

Unless planned, maintenance tends to occur when equipment breaks—typically a more costly arrangement that interrupts

Preventive maintenance requires linking maintenance plans with capital and operating budgets.

use of the building. Local jurisdictions should look out a minimum of three years and develop facility plans to guide maintenance that meets their overall needs. Of those performing preventive maintenance, about 53 percent of school districts (155 districts) and 26 percent of cities and counties (52 jurisdictions) reported that they wrote long-range plans for building maintenance.

Jurisdictions need a capital improvement program with specific proposals to meet their buildings' capital needs. About 55 percent of school districts (165 districts) reported developing a capital plan for facility components that included provisions for preventive maintenance. Of the cities and counties that perform preventive maintenance, 57 percent (109 jurisdictions) said they sometimes or consistently have such plans.

Based on the long-term plans, building managers should develop an annual maintenance work plan that lists expected projects and analyzes personnel needs. About two-thirds of school districts (191 districts) that perform preventive maintenance reported they had annual building maintenance plans, although the plans' completeness varied.

The work plan should be linked to yearly operating and capital budgets. Local jurisdictions should establish reserved accounts to fund major maintenance and renewal of buildings, such as tuckpointing brick exteriors. Of local jurisdictions that perform preventive maintenance, 9 percent of school districts (24 districts) and 20 percent of cities and counties (35 jurisdictions) reported relying consistently on reserved funds. Twenty-four counties reported consistently levying taxes for a "county building fund."

Example: The Wabasha-Kellogg School District developed a five-year capital plan that lays out expected major building expenditures. District officials update the plan yearly based on the buildings and grounds supervisor's estimates of building needs and costs. To secure funding for

buildings, each year the district allocates money to a reserved account for future capital projects.

4. Structure a Framework for Operating a Preventive Maintenance Program

Building managers should coordinate preventive maintenance with other maintenance projects. Lodging responsibility for coordination with specific individuals enhances accountability.

Including every piece of every building system in a preventive maintenance program is prohibitively expensive. Building managers must decide which equipment to exclude, such as equipment that can be replaced inexpensively.

Another step is developing checklists of preventive maintenance tasks and their frequency. About 38 percent of school districts (115 districts) and 18 percent of cities and counties (51 jurisdictions) reported that they prepare checklists of preventive maintenance tasks for most building components.

Building managers should set a yearly timeline for preventive maintenance activities. About 52 percent of school districts (160 districts) and 32 percent of cities and counties (94 jurisdictions) schedule preventive maintenance tasks for most components according to manufacturers' standards or other set intervals.

Other practices include adopting written procedures for managing the program and implementing preventive maintenance activities to control indoor air quality.

Example: In the city of North St. Paul, the building maintenance division follows checklists of preventive maintenance activities and uses handheld testing equipment during inspections. A schedule details maintenance to be performed and its frequency, including regularly changing filters and disinfecting HVAC components.

Temperature sensors allow the maintenance foreman to assess how well the HVAC is functioning and make immediate adjustments.

5. Use Tools to Optimize the Preventive Maintenance Program

To get the most out of preventive maintenance, building managers should incorporate preventive tasks into their work-order system. Doing so controls maintenance jobs and provides a written work record.

Building managers also need a systematic way to keep maintenance records. This ranges from computerized maintenance-management systems to simple spreadsheets to manual records. About 21 percent of school districts (63 districts) and 16 percent of cities and counties (47 jurisdictions) reported that they keep comprehensive preventive maintenance records for most building components.

To gauge how well a program is working, building managers should periodically evaluate their preventive maintenance program. They should also explore sharing maintenance expertise or equipment to gain efficiencies, improve services, and maximize the use of facilities.

Example: *With five nearby school districts, the Foley School District formed an “education district” that jointly provides certain maintenance services. The education district’s health and safety officer provides asbestos inspection, indoor air monitoring, and testing for lead in water, among other duties. By sharing costs, the six districts receive direct assistance for which they would otherwise have to employ additional staff or contract for services.*

6. Enhance the Competence of Maintenance Workers and Managers

Local jurisdictions should ensure that their maintenance employees receive training to

competently complete their tasks. This includes training related to job safety. Further, building managers may need managerial training in addition to hands-on maintenance skills.

Example: *Since 1994, the South St. Paul School District’s part-time health and safety officer has held one-day safety training twice yearly for maintenance workers, in addition to numerous briefer safety meetings. Over this time, work-related injuries have decreased. When the district upgrades building systems, it trains workers to properly maintain them, thereby avoiding consultant fees for the maintenance.*

7. Involve Appropriate Maintenance Personnel in Decision Making and in Communicating Buildings’ Needs

Local officials should include maintenance personnel in the early stages of the decision-making process when purchasing major components or designing space. Doing this helps avoid unnecessary costs as the design makes future maintenance needs explicit. In addition, building managers should develop an education strategy to inform their various audiences about building conditions, needed maintenance, and the consequences of deferring projects.

Example: *When Aitkin County designed a new jail, maintenance personnel offered input on the proposed HVAC system, pointing out that the designed heating units had shorter life expectancies and greater fuel consumption than an alternative. After considering the overall costs of purchasing and operating the two choices, the county ultimately selected the alternative with lower lifetime costs.*

Local jurisdictions can avoid costs by considering maintenance needs up front.