



WHITEPAPER:

THE DEFERRED MAINTENANCE CRISIS

PREDICTING NEGATIVE EFFECTS



Introduction

**PROVIDING PREVENTIVE
MAINTENANCE SAVES
MORE THAN \$13 PER SF
IN MAINTENANCE COSTS
OVER A 10-YEAR PERIOD
AND OVER \$25 PER SF
OVER 20 YEARS.***

"Preventative Maintenance Program Comparative Analysis for Criminal Justice Facilities" by Whitestone Research

The practice of deferring preventive maintenance to save money has led to a crisis in correctional facilities across the country valued somewhere between \$16 billion and \$32.5 billion. The deferred maintenance trend is leading to a decline in operational performance of our nation's necessary social infrastructure and public safety facilities.

The deferred maintenance crisis is exacerbated by the "pay as you go" policy employed by many state and local governments to fund on-going and capital maintenance.

Without proper funding and a policy correction, the cost of deferred maintenance will double every five years. If left unresolved for eight years or more, taxpayers will face facility replacement costs of \$130 billion in today's dollars. This may sound like a "sky is falling" reaction; but, considering that more than most of the prison facilities in America and jail beds in Georgia are at least 35 years old, and given that governments traditionally do not completely fund facility maintenance, there is a real deferred maintenance crisis for our nation's mission critical prison infrastructure.



MISSION CRITICAL FACILITIES

The public expects and requires certain services to be provided by government agencies. These services help define the mission of government and are not typically provided by private-sector vendors. The facilities that house these mission-critical services must function as intended in order to provide efficient and effective services to the public.

Some examples of Mission-Critical Facilities include:

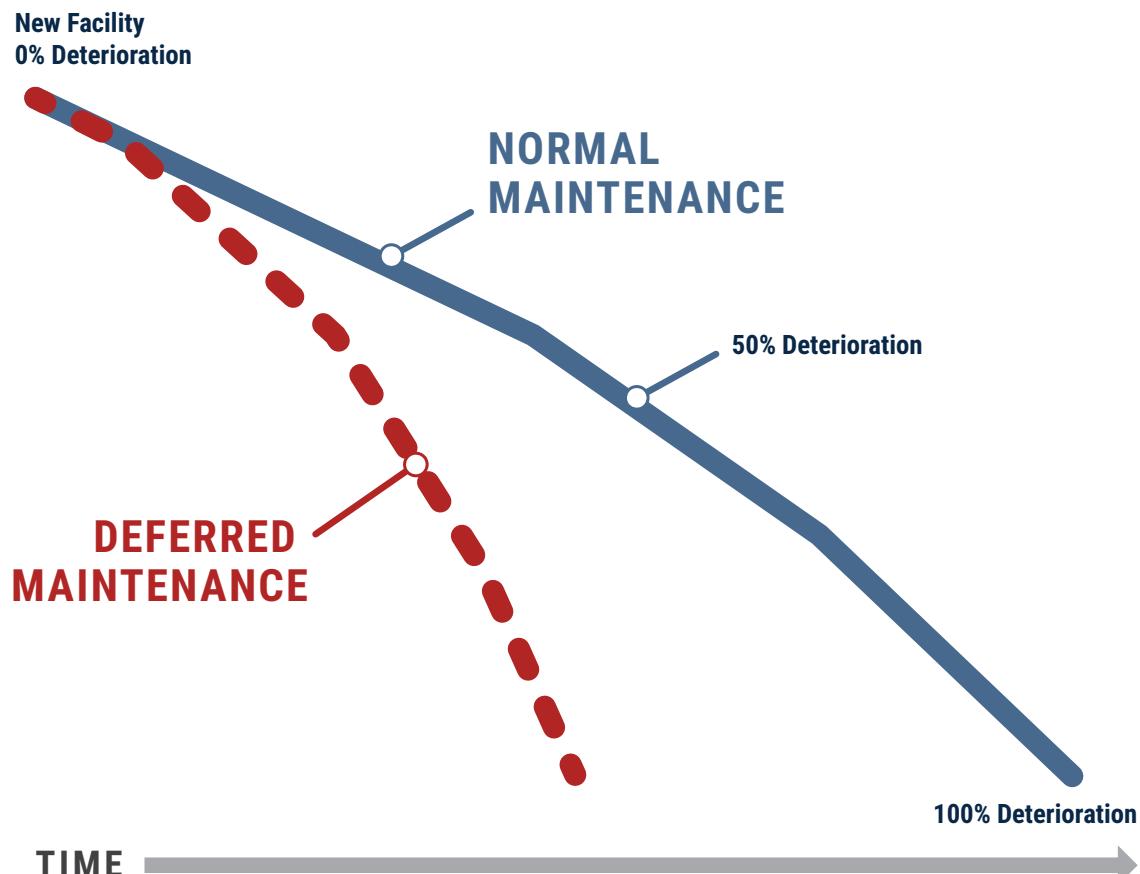
FIRE STATIONS

OPERATIONS/911 CENTERS

PRISONS/JAILS

COURTHOUSES





WHAT IS DEFERRED MAINTENANCE?

Deferred Maintenance is the total of systems that do not function or have gone without upgrade or replacement beyond their useful life. Some of the most common examples are computer based electronic security systems (seven year life cycle); Roofs (20 year life cycle) and Heating, Ventilation and Air Conditioning Systems (eight to 20 year life cycles).

The cost to resolve deferred maintenance has been identified through formal and informal surveys. The surveys indicate a cost range of \$30-65 per square foot, which sounds reasonable compared to new facility construction costs of \$300-400 per square foot. However, this magnitude of deferred maintenance can have a

profound effect on the secure and safe operation of a detention or correctional facility. For example, upgrading a touch screen electronic security system – the eyes, ears and control of a jail facility – costs about \$10 per square foot. Obviously, non-working controls pose security issues to staff and inmates. If the deferred maintenance cost is three to six times that amount, then it is practical to say that there are critical systems that do not function.

In today's economic reality, local governments cannot afford to perform 100 percent of all required maintenance in public facilities, which leads to a large volume of deferred maintenance. This not only affects short-term operations, but, if left unresolved, also significantly shortens the life of the building.

DEFINING THE EFFECTS OF DEFERRED MAINTENANCE

The industry standard scientific approach for defining the current condition of a building or fixed asset is the Facility Condition Index (FCI). The FCI was first developed in 1991 by the National Association of College and University Business Officers to provide a benchmark to compare the relative condition of a group of facilities. The formula was first published in Managing the Facilities Portfolio:

$$FCI = \frac{DM}{CRV}$$

WHERE: _____

DM = the cost of maintenance deficiencies, or
Deferred Maintenance

CRV = the total cost of complete facility
replacement, or Current Replacement Value

Managing the Facilities Portfolio uses the FCI ratio as a ratings system to indicate the relative facility condition:

- < 0.05 = **Good**
- 0.05 to 0.10 = **Fair**
- > 0.10 = **Poor**
- > 0.5 = **Replacement**

For a real example, the FCI ratios for a county or agency that has a total of 800,000 square feet of facility space indicate how much deferred maintenance the system can bear and still have facilities in good condition.

Assuming a replacement construction cost of \$360 per square foot, the Current Replacement Value of 800,000 square feet is \$200 million. Given that value, the FCI ratios show the potential value of all deferred maintenance in the facility:

- **Good** < \$18 million
- **Fair** = \$18-\$36 million
- **Poor** > \$36 million

The Causes of Deferred Maintenance

ECONOMICS

The increase in construction costs over the past ten years has made it difficult for local governments to pay for the personnel and materials in order to keep up with building maintenance requirements. Though economics are the root cause for the deficiencies caused by deferred maintenance, there are also other factors that lead to economic deficiencies.

TIME CYCLES

The cycles that affect the proper performance of maintenance in correctional facilities often do not coincide. The overall life cycle of the building must be planned for when the building is in construction. However, that cycle, at 30-50 years, is much longer than most government officials remain in office. The four-year election cycle does not promote consideration of the building's life cycle and the total cost of ownership.

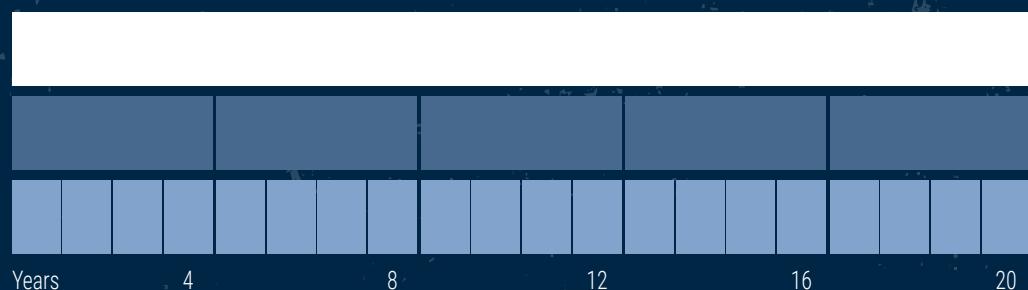
Beyond election cycles, officials must reconsider how to fund building maintenance on a yearly budget cycle. This yearly reconsideration of funding may change the priorities of maintenance funding without consideration of the Total Cost of Ownership. Rather than considering the life cycle cost of the facility, yearly budgets may shift with economic conditions or the political climate. This may lead to continuous shifts in priorities and an increase in maintenance backlog.

Budgets cannot keep up with the maintenance needs of modern mission critical facilities. When state and local systems must make the choice between providing public-facing services like public safety and human services, and background services like facility maintenance, the day-to-day safety and operation of these mission-critical facilities will win. In an environment where keeping firefighters employed is difficult, maintenance personnel are put at risk. Reducing maintenance personnel leads to increased deferred maintenance.

BUILDING LIFE CYCLE
20 Years

ELECTION CYCLES
Every 4 Years

FUNDING CYCLES
Annually



The Causes of Deferred Maintenance

CONSTRUCTION CONDITIONS

Without consideration of maintenance and operations during the construction process, cities and states are forced to deal with less-than-ideal maintenance conditions. Input from the building's owner, is critical for the designers and constructors to understand how to maintain the building over its entire life. Without the agency's input, construction may not match the agency's ability to maintain its facilities.

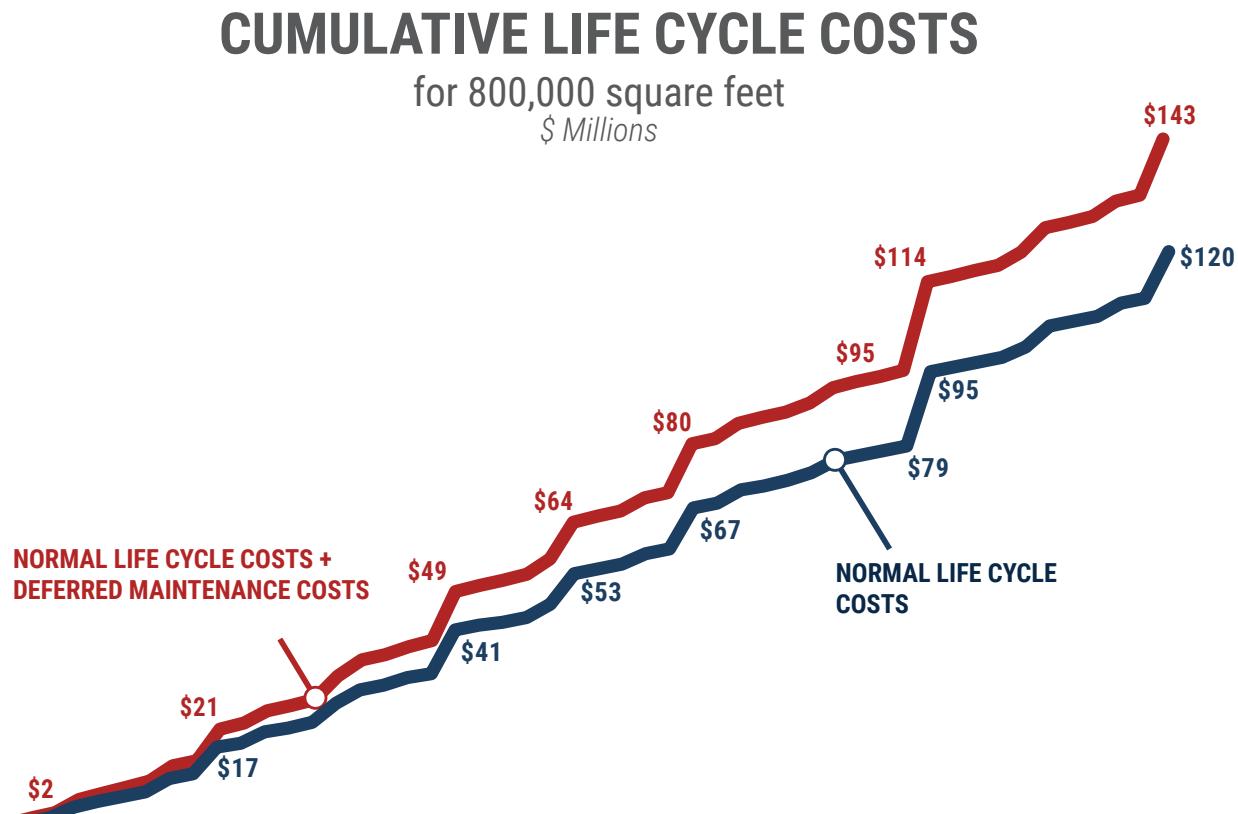
PERSONNEL QUALIFICATIONS

Unskilled, under-qualified or understaffed personnel cannot properly perform the necessary maintenance for the facility. For example, an electronics technician or certified electrician is needed on-site to ensure security systems, such as locking systems and CCTV cameras, function as intended. However, many cities and states cannot afford to employ their own dedicated and licensed electrician and will either hire an outside contractor (at added expense) or work with existing resources; i.e., under-skilled staff. This inability to perform maintenance as required increases the backlog of maintenance. More importantly, this under-performance of maintenance may also lead to poor or unsafe conditions.

Total Cost of Ownership

**ALL OF THESE FACTORS HAVE A NEGATIVE EFFECT ON THE TOTAL COST OF OWNERSHIP.
WHEN MAINTENANCE IS DEFERRED, THE COST OF MAINTENANCE INCREASES BY
APPROXIMATELY 20% EVERY YEAR.**

In other words, deferring maintenance may solve short term issues, but creates new long-term issues - including the premature failure of equipment and facilities.



The Impacts of Deferred Maintenance

COLLATERAL DAMAGE

Facilities may incur added maintenance costs when building systems fail. For example, roof leaks damage ceilings, walls, electrical systems, and other building components. When HVAC filters are not changed, coils get damaged and require cleaning and repair. All of these unnecessary repairs negatively impact the cost of maintenance.

EXCESSIVE REPAIR COSTS

The true impact of deferred maintenance is in the increased cost to perform standard maintenance activity. By putting off maintenance or using subcontractors to perform maintenance, many agencies are actually spending more, especially over the life of the building.

CODE & REGULATORY COMPLIANCE

Local building codes have very specific requirements for safety and operation. Deferring maintenance or using unskilled labor to perform maintenance may lead to violations of local codes and ordinances. Improper or non-performance of maintenance may also jeopardize compliance with regulatory standards.

INCREASED RISKS

When maintenance is not performed as intended, the risks to staff and personnel increase. The risk of early building failure also becomes a reality. However, there are other, less tangible risks increases, such as insurance risk and liability. These risks increase the cost of ownership and the overall ownership burden.

OVERBURDENED MAINTENANCE STAFF

By deferring maintenance, maintenance staff perform more work, and work they may not be trained to perform, in an attempt to achieve more work from fewer personnel. However, this practice overburdens maintenance technicians and reduces the quality of their work, requiring rework and increasing equipment liability.

UNRELIABILITY & UNAVAILABILITY

Unmaintained or under-maintained buildings and equipment lead to unavailable equipment and room spaces. Without reliable equipment and space, day-to-day activities cannot happen as planned, leading to lost productivity and inefficient operation.

INEFFICIENT ENERGY USE

Equipment that is not maintained does not perform as intended. By not performing to design standards, equipment requires more energy to run properly, resulting in higher utility costs. Energy normally costs \$3-\$5 per square foot; but, with poorly maintained equipment, that cost increases by 5%-10%.

INFLATION

With an annual average inflation rate of 4%-6%, maintenance that is put off today will cost more to catch up tomorrow.

Where Does Your Facility Stand?

ON AVERAGE, A 250,000+ SQUARE FOOT PRISON CAN SAVE \$2.5 MILLION PER YEAR OVER 20 YEARS BY SPENDING \$2.84 PER SQUARE FOOT PER YEAR (\$284,000) FOR MAINTENANCE.

"Preventative Maintenance Program Comparative Analysis for Criminal Justice Facilities" by Whitestone Research

How do you justify the funding to provide the right program for your facilities? Each agency will have different needs. Individual facilities within each system may have unique maintenance requirements. Facility size, type, age, and condition are all factors to consider when establishing the right maintenance service. Facilities with complex equipment systems or outdated building infrastructure will have their own operational challenges. For example, some remote prisons have sewage treatment plants that require very specific personnel, supplies, and materials. Other variables include the magnitude of vandalism, geographic factors (e.g., cold weather or salty air), local labor requirements, availability of personnel, etc.



In any case, the relationship between the facility size and its age provides a starting point for developing an effective budget for a comprehensive maintenance program, focusing on preventive maintenance. Costs are directly related to the size of the facility, while age and condition influence the overall spend necessary to keep the facility functioning as designed:

RECOMMENDED STAFFING AND SPEND RATE FOR PREVENTIVE MAINTENANCE IN JAIL AND PRISON FACILITIES

FACILITY SIZE SF	MINIMUM RECOMMENDED STAFFING*	RECOMMENDED \$/SF**	AGE FACTOR ADDITIONAL \$/SF		
			<10 yrs.	15-20 yrs.	>20 yrs.
250,000	7 to 9	2.75	0.15	0.5	0.75
500,000	15 to 17	2.65	0.12	0.40	0.60
1,000,000	30 to 35	2.50	0.10	0.40	0.60

Providing your budgeting authority with justification for your maintenance program begins with measuring your program and identifying the right spend rate for your individual facility needs. Your spend rate can be boiled down to a dollar-per-square-foot calculation, but is made up of variable costs, such as:

- Non-skilled labor
- Skilled labor, with variance between disciplines such as plumbing, electrical, HVAC, etc.
- Availability of inmate labor
- Specialty subcontractors and certifications
- Employee benefits
- Materials and supplies
- Replacement and renovations, including project management
- Capital improvements, including project management
- Administration
- Licensing, permitting, or other regulatory costs
- Certification requirements

* Includes all necessary trades, management, and administration

** Includes all relevant costs, including labor, supplies, subcontractors, etc.

Solving and Preventing Deferred Maintenance

1

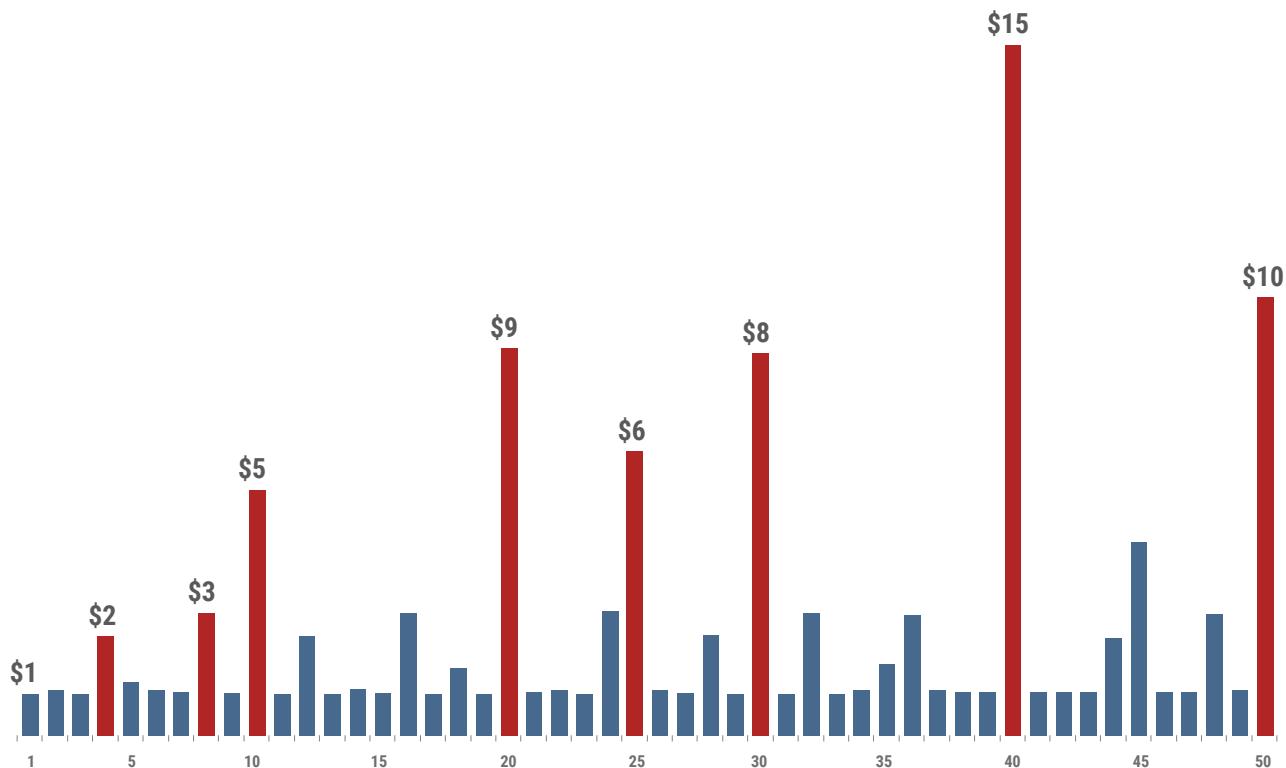
Reform the budget process to recognize the total cost of ownership:

By understanding and incorporating the Total Cost of Ownership of buildings and facilities into yearly budget discussions, governments and state agencies can prevent deferring maintenance and, over the long term, better manage the costs to own and operate its assets.

2

Establish either the preventive maintenance or the predictive maintenance model:

Addressing maintenance before failures improves the maintenance staff's ability to respond to maintenance and keep costs down. Preventive and predictive maintenance programs are meant to prevent failures, limiting and avoiding the added cost of break-down repairs.



Maintenance costs (\$ millions) per year over the 50-year life span of 800,000 square feet.

3

Establish a reserve fund for each building:

A Maintenance Repair and Replacement fund – a kind of maintenance escrow account – gives the facility a vehicle to plan for future maintenance needs without disruption of normal local and state budgeting procedures. This fund also allows for needed capital replacements at specific intervals, therefore lessening the burden on the county or agency when equipment or building replacement needs arise.

4

Transfer ownership and risk of ownership to the private sector:

Agencies and municipalities can also shift the risks of ownership to the private sector through public-private partnerships, such as sale-lease back programs. By transferring ownership or management to a private owner, it is guaranteed through a contract that maintenance on the buildings will be performed as intended throughout the building's life.

In today's climate, many cities and states across the country are currently facing growing pressure to drastically reduce spending. Deferring preventable maintenance not only critically affects the total cost and functionality of these mission-critical facilities, but it also puts staff at greater risk of harm. State agencies and municipalities can minimize the impact of deferred maintenance by:

- **Planning to fund maintenance using the Total Cost of Ownership Model and providing a vehicle for long-term maintenance funding**
- **Ensuring technical maintenance staff is qualified and not overburdened.**
- **Implementing a preventive or predictive maintenance model to limit or eliminate failures and unnecessary repair costs.**
- **Partnering with the private sector to lower costs and improve performance.**



To get a full assessment of your maintenance program to determine the savings you could reach by adopting preventive maintenance, call or email our Justice Facilities Expert Greg Westbrook:

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