



AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE

EXAMINING THE COSTS, BENEFITS
AND BEST PRACTICES OF A
PREVENTIVE MAINTENANCE PLAN IN
YOUR EDUCATIONAL INSTITUTION

Table of Contents:

Section I: Can you make the case for a preventive maintenance (PM) program? **3**

Section II: What are the ‘good to great’ schools, colleges and districts doing with PM?..... **4**

- 1. How does a PM program affect overall costs and emergencies? **4**
- 2. What are the financial impacts to facility capital needs? **5**
- 3. How can PM impact the energy efficiency of your buildings and your utility costs? **7**
- 4. How does PM affect other costs or risks, such as insurance claims? **8**

Section III: PM can save money, now what? **9**

Section IV: I’ve proven my case; how do I implement a PM program? **10**

- 1. Get Buy-in **10**
- 2. Start Small **10**
- 3. Develop a Solid Process **10**
- 4. Keep it Going..... **11**

Conclusion: Are you ready to reap the reward?..... **12**

Introduction

Nationwide, educational institutions have been facing fiscal crises year after year. With scant budgets comes the troubling and exacerbating problem of justifying needed staff versus performing proper facility maintenance. As a result, preventive maintenance (PM) has become a “nice to have,” not a “must have.” Many buildings are in threat of failing, new buildings are not well maintained and your capital investment is compromised.

This study examines data from thousands of educational institutions currently using SchoolDude’s online solutions for work order management and preventive maintenance. The analysis reveals costs and risks that help facilities directors and physical plant managers make the case for supporting and funding a preventive maintenance program. The study further explores a sampling of “PM All Stars,” or leading performers in the area of preventive maintenance, and offers their best practice insights.

SECTION I:

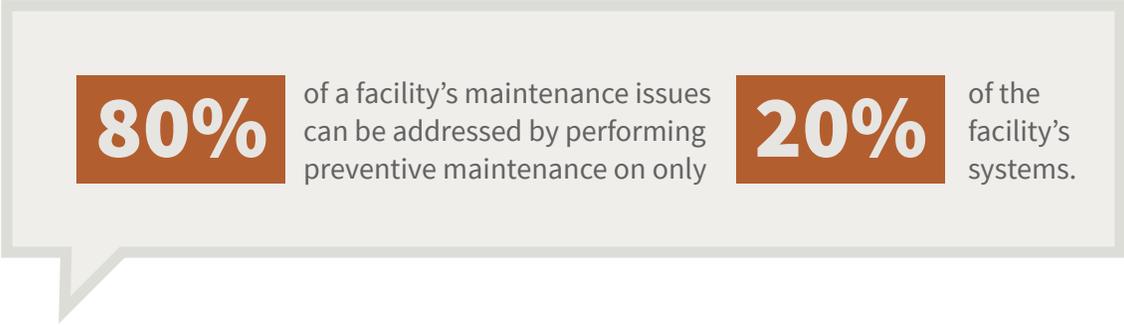
Can you make the case for a preventive maintenance program?

In tough budget environments, unfortunately, preventive maintenance is often the first program to get postponed because the benefits are not immediately obvious. Proactive work often gets re-prioritized by the immediate and urgent corrective or emergency maintenance work at hand. How does that impact the overall long-term cost of maintenance or the overall cost of stewardship of the investment in the school or college facility?

We've all heard the old sayings:

- *Pay me now or pay me [more] later.*
- *An ounce of prevention is worth a pound of cure.*

We believe those statements to be true, but are they? How do you answer the finance committee or the business officer when they ask how performing preventive maintenance (PM) really saves money?



80%

of a facility's maintenance issues can be addressed by performing preventive maintenance on only

20%

of the facility's systems.

SECTION II:

What are the ‘good to great’ schools, colleges and districts doing with PM?

SchoolDude has gathered a wealth of data by serving a large population of educational facility professionals across the US for many years. Since each client is served from SchoolDude’s data center and the data exists collectively in the cloud, we can perform unique ‘data-mining’ to obtain insight into this question. From this unique perspective, SchoolDude set out to answer 4 questions regarding how to justify a preventive maintenance program:

1. How does a PM program affect overall costs and emergencies?
2. What are the financial impacts to facility capital needs?
3. With utility costs comprising a large portion of the M&O budget, how can PM impact your energy use and building efficiencies?
4. How does PM affect other costs or risks, such as insurance claims?

PM COMPLETION % RESULTS



WHO IS A PM ALL STAR?

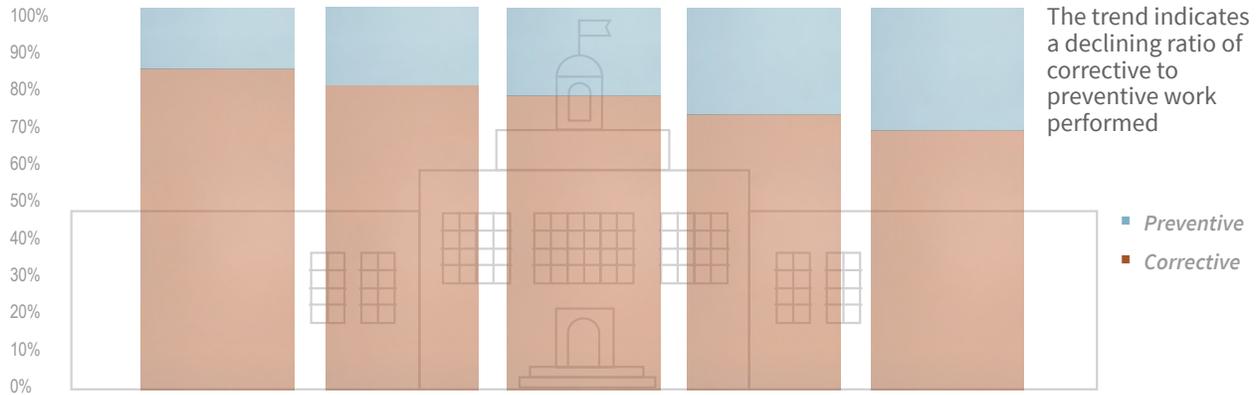
- More than 30% of maintenance resources are allocated to PM work.
- Average completion rate > 98%
- History of 3+ years of PM data

1. How does a PM program affect overall costs and emergencies?

The PM All Stars study revealed some significant insight:

- **PM All Stars performed less emergency work, saving time and money. Those colleges or school districts with a strong PM program enjoy:**
 - A 50 - 65% reduction in the rate of emergency work
 - A 28.6 - 39.3% reduction in average cost per work order
- **Preventive work reduces the amount of corrective work required.**
 - Over a 5-year period, a sampling of PM All Stars garnered a 16% reduction in corrective maintenance work as a percentage of the total work over the time period.
 - For a 20-organization sample across the 5-year time span, the corrective work as a percentage of the total work is reduced from approximately 87.28 - 71.29% of the total work performed.

CORRECTIVE TO PREVENTIVE WORK PERFORMED



Another way to look at the impact is to compare the cost and rate of emergency or corrective work versus PM work. Emergency work is costly and disruptive, often requiring overtime, emergency shipping, expedited services, and disruptions to the classroom.

Average cost of emergencies

Sample Group	Average work order cost reduction for PM All Star
Public K-12	28.6% less costly
College/University	37.3% less costly

Rate of emergencies

Sample Group	Rate of emergency average	Rate of emergency for PM All Stars Group	Reduction in emergencies for PM All Stars Group
Public K-12	1.89% or 1 emergency out of 53 work orders	0.67% or 1 emergency out of 147 work orders	64.5% reduction
College/University	0.64% or 1 emergency out of 156 work orders	0.31% or 1 emergency out of every 322 work orders	51.5% reduction

2. What are the financial impacts to facility capital needs?

Two of the most common facility expenses to be considered in a capital plan are the roof and the HVAC. For this reason, let's examine each scenario in more detail.

I need a new roof!

A school or university's roof is often the most neglected area of preventive maintenance. Many roofs have a 20-year manufacturer warranty with strict caveats requiring scheduled maintenance. However, according to studies from roofing industry associations, many roofs see only a 12-year lifespan due to common deferred maintenance practices. It will cost \$4 long-term to remedy every \$1 "saved" by deferring maintenance now. That's easy to understand when you think of a neglected \$60,000 roof repair becoming a mandatory \$240,000 mold remediation problem. Industry research lists the replacement or repair of a roof among the 30 most costly maintenance and repair tasks over the typical 50-year life expectancy of your building. Conversely, a solid preventive maintenance program for roofing can generate an expected 30% extension of the life of that asset and delay major capital impacts from arriving too early.

What about HVAC?

If your HVAC unit is not properly maintained, you can expect repairs to cost 3-4 times more than the cost of preventive maintenance. Think about it: if you don't perform routine maintenance on your car, it will greatly increase the cost of ownership. Regular oil changes are a lot less expensive than a new engine. Maintaining an HVAC system is no different.

In addition, the more an HVAC unit struggles with dirty filters or poorly maintained parts, the more energy it takes to heat or cool an area, raising your already costly utility bill. Various studies also reveal a direct correlation between indoor air quality and energy efficiency at a campus to student performance and wellness.

What are the overall costs? Let's do the math.

Not everyone can relate to cost per square foot, and some departments or sites are funded by cost per student, so let's look at some simple math:

American School & University's (AS&U) 35th Annual Official Education Construction Report showed that a new school's construction cost could range between \$18,000-\$23,000 per student (\$150-\$170 per sq. ft.), so let's use an even number of \$20,000:

- A roof is roughly 6% of the building's cost or \$1200 per student.
- HVAC systems are roughly 10% of the building's cost or \$2000 per student.
- This totals out to \$3200 per student for both HVAC and roofing construction costs.

Now, let's say a typical roof and HVAC system will last 15 years...we hope:

- This 15-year life divides into \$3200 to yield \$213 per student per year.
- If we perform PM, the experts suggest the life of the system is extended by 30%. But, let's just use a conservative 2 years. If a PM program gets just an extra 2 years out of a roof and HVAC system, we are essentially spending \$188 per student per year, which is a savings of \$25 per student per year.
- If we are a 3000-student institution, we've saved \$75,000 annually in capital impacts over the lifespan of roofing and HVAC.



*How many jobs could this save?
How many student programs
and initiatives might have
continued instead of being cut
from the budget?*

3. How can PM impact the energy efficiency of your buildings and your utility costs?

Consider this fact: according to the 2009 AS&U M&O cost study, energy expenses comprise nearly 32% of operating budgets. With energy price increases, institutions can expect costs to rise by 25% in the next 3-5 years. This elevates the importance of effective energy management.

Reducing energy use can be relatively easy to accomplish and almost immediate with better M&O practices. According to the U.S. Department of Energy, an average institution can save 10 - 15% in energy with no cost or low cost measures, just by raising awareness.

Now couple your energy management program with PM initiatives. A recent comprehensive study — including Stanford University, UCLA, Cornell University and Rocky Mountain Institute — places M&O as the prime cost-savings opportunity in schools across the country. There is an estimated 50-60% of potential energy savings in existing buildings through M&O improvements such as PM. And your energy program can tell you things about your buildings, offering benchmarks (like ENERGY STAR® ratings) and comparisons of building performance which can then identify focus areas in your PM program.

Let's look at a specific scenario.

In anecdotal discussions with several energy service firms who guarantee energy savings to their clients, the following methodology can be applied by an energy engineer in determining energy savings as a result of a comprehensive HVAC PM program:

- *Isolate the part of the energy load that is HVAC related – a rule of thumb in an education setting is 50%*
- *Estimate **10% energy savings** on that portion of the load, as well as the added efficiency of well-maintained HVAC equipment*

Using AS&U data on average energy costs per student in K-12 and Higher Education and this methodology yields **\$10-\$16 per student per year in energy savings** as the result of a PM program.



ENERGY SAVINGS
\$10-\$16
PER STUDENT ANNUALLY
FROM A PM PROGRAM

4. How does PM affect other costs or risks, such as insurance claims?

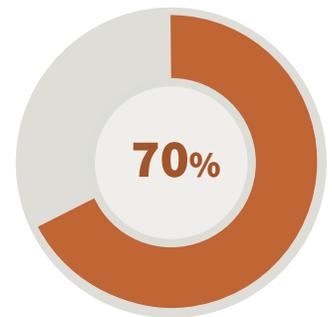
SchoolDude also collaborated in a landmark study conducted by a major national insurance company. This insurance company holds claims data over 5 years on a very large percentage of schools and colleges in the United States. The study looked at de-identified data and the intersection of the following data sets:

- *Approximately 19,000 school buildings for which there was insurance claims history*
- *Approximately 12,000 SchoolDude client buildings, some of which benefited from a PM program*
- *Of those, there was a sample size of approximately 9,000 schools where data existed*

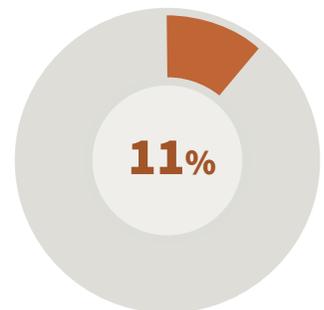
Analysis of the data from these 9,000 institutions revealed the following conclusions:

- *Those schools that had an effective PM program experienced a 70% reduction in claims.*
- *Of those claims experienced, the severity of the claim was approximately 11% less costly than those claims occurring in schools without a PM program.*

Although this unpublished, proprietary insurance study could not conclusively prove causality, the facts speak for themselves.



REDUCTION IN INSURANCE CLAIMS
WITH AN EFFECTIVE PM PROGRAM



INSURANCE CLAIMS LESS COSTLY
THAN THOSE WITHOUT A PM PROGRAM

SECTION III:

PM can save money, now what?

It's easy for groups to prioritize other needs over facility needs, but here's the question to pose to your non-facility decision makers: "If you don't have a roof on your home, or your air conditioning system went down in the middle of a hot day, how much focus would you put on cooking dinner that night? Likewise, if this building fails, how can we expect our students and staff to focus on learning?"

Not performing PM compromises the overall mission of any organization, especially education. Instead, persuade your stakeholders to **consider the \$100M+ investment** that was made toward that learning environment. **PM is an incremental investment to protect the educational assets critically needed for an adequate learning environment. Proper PM ensures optimal life of equipment with minimal costs, therefore maximizing the core mission of the institution.**

If your building fails, how can we expect our students and staff to focus on learning?

If your facilities services department is not getting what it needs, or is being reviewed for potential cuts, start promoting your department services and the need to maintain facilities and prevent costly repairs. You must "sell" and offer insight into your department's operational functions and requirements, but you must also closely tie those functions into the mission of your school or campus. Show how the organization's mission will be affected by what is done or not done within the campus environment. Reducing the number of recycling pickups or the extent of grounds maintenance can be negotiable, but keeping the essential building systems consistently and safely functioning should not be.

PM is an incremental investment to protect the educational assets critically needed for an adequate learning environment. Proper PM ensures optimal life of equipment with minimal costs, therefore maximizing the core mission of the institution.

SECTION IV:

I've proven my case; how do I implement a PM program?

Getting a new initiative or process implemented is often the most difficult hurdle to overcome. But help is at hand. The top-performing PM All Stars shared their best practice insights to make your job easier. Follow these steps, and you can be a PM All Star in your organization too.

1. Get Buy-in

- *Show how the program supports the overall mission of your institution: if it's a college, university or private school, link the facility condition to the competition for students and staff; if it's a public school, make the case for maintaining a safe and comfortable learning environment that enables student achievement.*
- *Make sure the plan is "doable" – an automated, web-based solution makes sense. Tracking and reporting capabilities make it measurable, quantifiable and make the pitch easy.*
- *Get staff involved in the decision and implementation; make it a "team" effort. Explain the benefits to them.*

2. Start Small

- *Plan a progressive rollout and reasonable timeline – whatever makes the most sense for your institution or campus. A good place to start is with life safety equipment. What public school board could deny a request to perform minimum life safety inspections? Some organizations have segmented the campus into quadrants and rolled out in phases. Build a timeline in which you can accomplish a little each month; don't try to do it all at once.*
- *Once you've identified focus areas, list the PM activities, gather manufacturer data and service guides for relevant equipment and collect as much information as possible to support the plan.*
- *Identify benchmarks or metrics such as: work order backlogs, average time to complete work, PM vs. emergency work, and costs per building.*

3. Develop a Solid Process

- *Look at current staff skill-sets and break out the workflow accordingly. If they don't have the current mindset, help them to get there. Consider a monetary incentive. Ask for their input. Get them invested.*
- *Use the PM templates provided by SchoolDude or other parties to standardize your task lists. Document as you go for future training and consistency.*
- *Schedule life safety inspections and PMs for major building equipment such as HVAC and roofing.*
- *Track your labor costs for better reporting. Dollars or labor hours saved/spent tend to resonate better than number of work orders performed. This data also helps to identify inefficiencies and is critical when making decisions of whether to outsource or not.*

Implementation Plan:

- 1) Get Buy-in
- 2) Start Small
- 3) Develop a Solid Process
- 4) Keep It Going

- *Couple your PM plan with a work order management solution. Compare and report on corrective versus preventive maintenance costs. This allows you to make better decisions regarding the repair or replacement of major items. Two automated systems that work together will provide you with powerful data for justification and planning.*
- *Consider an inventory solution that also works with your work order and PM programs. An automated system can order parts and supplies for some annual PM inspections, eliminating the need for a double visit.*

4. Keep it Going

- *The tools allow you to constantly keep up-to-date with needs assessments. Prepare for budget cycles with data and reports. Elevate the status of your team's contribution by reporting on your success and accomplishments. While an efficient facilities department is considered "transparent," one that supports the overall mission of the organization will gain a newfound respect!*
- *Compare data year to year; identify trends and hotspots; expand your program accordingly.*
- *Consider a charge-back system: the cost of completing each request submitted must first be approved. This makes requesters think harder about the importance and priority of the request before making it.*
- *Communicate well with stakeholders, requesters and staff. An automated work order system will keep requesters informed of the status of their request, improving customer service, accountability and productivity.*

CONCLUSION:

Are you ready to reap the reward?

So, are you ready? Do you feel better equipped to face another tough budget cycle? As a good steward of the investment in our schools and campuses, be ready to answer those hard questions with quantitative data: preventive maintenance pays off in the long run!

Learn more about SchoolDude solutions for maintenance and preventive maintenance and how they can benefit your educational institution.

THE BEST OF THE BEST: PM All Stars Share Their Insight

SchoolDude recognized representatives from the school districts, colleges and universities across the nation that are the elite among their peer group in preventive maintenance excellence at SchoolDude University in 2010. In addition to examining the data of more than 5,000 organizations, the best practices of these “PM All Stars” have become the basis for this paper. We applaud and thank them for their contributions.

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