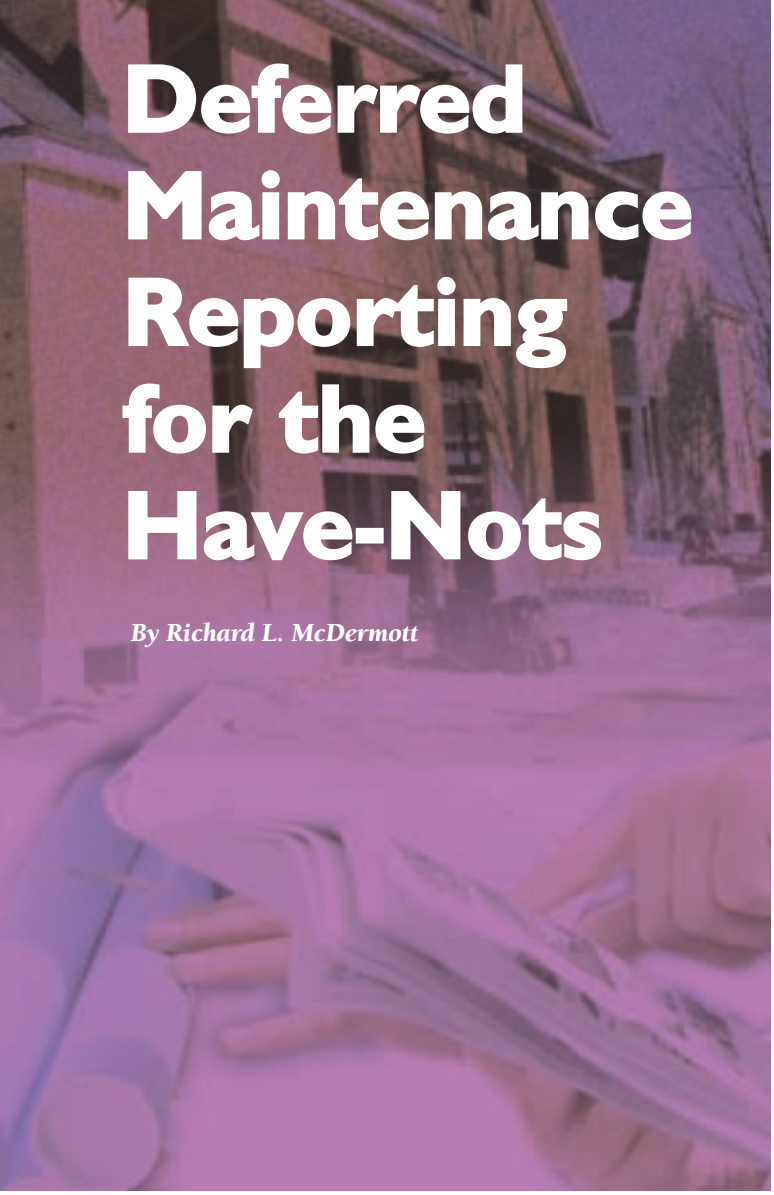

Deferred Maintenance Reporting for the Have-Nots

By Richard L. McDermott

I was stuck. I was at an institution that was never going to fund equipment and system replacements according to their "industry standard expected service lives." It was time to make a report to the executive group about the deteriorating state of the physical plant, but I was not sure how to arrive at a point that would be meaningful to the decision makers. I wanted to be able to hit the ball out of the park, but felt like I was standing there with a wiffle bat, which is an ineffective tool of persuasion.

I remembered watching a TV interview of college basketball coach Bobby Knight. His answer to a reporter's questions about goals that were unrealistic for his team was "Sometimes a goal is just not possible. When faced with that, you need to get on with something that is attainable." Good advice. I started moving along with the usual steps in putting together a report—but kept an eye out for that attainable something.

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Qualification

This topic is not for institutions that have plenty of money, which replace everything in the facilities inventory according to its "industry standard expected life cycle." It's nice to be able to travel that route. However, there is broader path that most of us follow. It is usually referred to as "running systems and equipment to failure."

Back to the Story

I was following the usual three steps:

1. Complete a survey that lists individual projects
2. Complete a management report that presents what has to be done
3. Identify a necessary funding level

If you do not like assumptions, find a way to measure what is really going on. Follow the empirical path.

I realized I was putting together a boring presentation and if I was bored with it, I was going to bore the executive group. The focus was fuzzy. It was going to be a real labor to bring relevance to the punch line. It did not stand up and speak to an executive group that was comfortable with:

- Running systems and equipment to failure—tell us when it is about to fail then we will deal with it.
- Saw little relevance in what other institutions are doing or in national physical plant benchmarking factors.
- Were not looking to spend more money on maintenance— the zero sum game meant they would have to take it from someone else.

The Well-Worn Path

I found the available literature usually offered the following:

Deferred Maintenance/ Deferred Maintenance Backlog/ Accumulated Deferred Maintenance Backlog: Total dollar amount of existing maintenance repairs and required replacements (capital renewal), not accomplished when they should have been, not funded in the current fiscal year or otherwise delayed to the future.

Deferred Maintenance Backlog Deterioration/Plant (Facilities) Deterioration Rate:
Facilities and equipment are in a constant state of degradation. The rate of deterioration may be expressed as a percentage of current replacement value per year. A benchmark deterioration rate for a reasonably well maintained facility is approximately 2.5 percent per annum.

Facility Condition Index (FCI): The facility condition index (FCI) is expressed as a ratio of the cost of remedying existing deficiencies/requirements, and capital renewal requirements to the current replacement value (i.e., FCI= (DM+CR)/CRV).

While property owners/managers establish independent standards, a "fair to good facility" is generally expressed as having an FCI of less than 10 to 15 percent.

Therefore, for local campus predictions, you needed to assume critical variables. By doing so, you lose relevance, not gainit. I started seeing that wiffle bat appearing in my hands again. Wrong path—choose another one.

Empirical Path

If you do not like assumptions, find a way to measure what is really going on. Follow the empirical path. I have always liked the word empirical. It usually means not boring or fuzzy. It is something interesting and real. You can get your hands around it. An empirical fact would be something the

How an institution defines and what it places in the backlog will vary. FMers are not a devious lot. However, there are grey areas in the process.

Executive Group could see when they looked out their office windows. If you have completed a quality survey:

- you have accurate data
- you have the current aggregate backlog
- you have the time over which it all occurred

Why not calculate empirical factors?

TABLE 1

Medical School Building
Cyclotron
Operations Center Bldg
School of Public Health
University Center Tower

Building	Year Built	Current Year	GSF	Weighted Average Age
A	1978	2005	864,608	14.35
B	1984	2005	17,522	0.23
C	1981	2005	212,678	3.14
D	1977	2005	239,547	4.12
E	1974	2005	291,918	5.56
			1,626,273	27.41

Buildings
Weighted Average Annual Deterioration Factor

Building	Year Built	Current Year	GSF	Weighted (by sq ft) Age	Unmet Deferred Maintenance Backlog	Current Replacement Value (CRV)	Average Annual Backlog Addition	Average Annual Backlog Addition Rate
A	1978	2005	864,608	14.35	$38,597,752	$363,556,000	$1,429,546	0.39%
B	1984	2005	17,522	0.23	$581,004	$6,140,000	$27,667	0.45%
C	1981	2005	212,678	3.14	$2,279,688	$44,714,000	$94,987	0.21%
D	1977	2005	239,547	4.12	$14,994,369	$100,727,000	$535,513	0.53%
E	1974	2005	291,918	5.56	$13,254,024	$82,817,000	$427,549	0.52%
			1,626,273	27.41	$69,706,837	$597,954,000	$2,515,263	0.42%

Now we have something interesting

The average annual backlog addition rate is 0.42 percent. This is an analytical tool that I did not have before. And, while it might not be perfect, it has to be miles better than a bunch of assumptions.

The Udder Way

What does the 0.42 percent factor represent? It is a long way from the 2.5 percent deterioration rate mentioned in the literature. It is the empirically derived Unmet Deterioration Rate (UDR, pronounced "udder"). The UDR is the average annual amount of deferred maintenance accumulated above everything else at work to create it or remove it. The UDR:

- reflects past funding actions
- reflects normal deterioration
- includes accelerated deterioration
- reflects empirical equipment service lives

The UDR includes empirical service lives—not textbook expected service lives. Let's call them elastic service lives because they stretch the serviceably of equipment to the limit. Excluded from the concept of elastic service lives are critical systems such as fire and life safety, elevators, BSL lab support, etc. Available funds must at least address everything in the critical failure category. If they do not, that is a presentation different from the one being described in this article. elastic service lives are already factored into the result. Why? The deferred maintenance backlog is set at the current level |of institutional acceptance.

What can we do with it? We can predict the future—with a plausible level of accuracy. Campus options do not have to be shown as a confusing array of possible outcomes. Rather, the analysis can pinpoint the institution's future. Let's put a few more pieces in place, and then get back to predicting the future.

What is your Backlog?

How an institution defines and what it places in the backlog will vary. FMers are not a devious lot. However, there are grey areas in the process. If a governing body dictates that deferred maintenance has to be within a certain range, magically all institutional reported values fall within that range—like the news from Lake Wobegon, where all the men are good looking, all the women are strong, and all the children are above average.

For this analysis, items in the backlog figure are ones that do not currently have a funding source.

Where do you draw the circle around what is the backlog? For the first cycle, it is not that important. Regardless of where you draw it, it should be the same "freeze frame" of the current campus condition. Try to keep the time horizon near-term. Small errors can become large if the study projects too far into the future. What is crucial is where you draw the circle when you repeat the backlog survey. It has to be the same circle of inclusiveness, or you are not talking about the same thing.

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What is your FCI?

The relevance of the Facilities Condition Index (FDI) isn't that it falls into a certain range, or that it is something that can be benchmarked against other institutions. It describes a condition of the institution that the executive group sees on a daily basis:

- It is useful in pinpointing where an institution is at the present time
- It requires an answer to the question "Is this condition acceptable?"
- It is useful as a reference point to check if an institution is in a state of equilibrium—or not.

As long as the variables used in calculating the FCI in cycle one are treated in the exact same manner in cycle two, you have a powerful trending analysis tool.

What is the Funding History for Deferred Maintenance?

The accounting record reveals the funding history that produced the current backlog.

This is good to know, but not part of the analysis presented in this article. The executive group does not need to be reminded about what has been funded and what is not a problem. That is another subject for another day.

Predicting the Future with Decision Charts

A good chart is worth a thousand words. Especially a chart that predicts the future based upon real conditions. A simple excel spreadsheet with chart wizard is all that is needed. Set the spreadsheet up so it is on the screen and active as you talk with the executive group. Make changes as they are discussed. Eliminate the delay of getting back later with results from changes discussed during the meeting.

Decision Chart 1 puts the picture and questions into sharp focus. The executive group is clearly staring at their own institution. This is like taking Scrooge on a visit to Christmas Future, knowing he will come back with a conviction to change things.

This is what the institution's condition looks like today, and more importantly, what it will look be in 10 years with the same conditions held constant. Why is the curve nice and smooth? Because of the ability to use elastic service lives in

the analysis. Equipment and system replacements are scheduled when they fit into an annual budget. The FCI curve is added as a reference point to emphasize change in the institutional curve.

Some interesting products of the analysis

- The campus is not in equilibrium—it is getting worse over time
- At some point in the future, the financial inertia between the campus condition and where it needs to be will be enormous. It will take an extraordinary action to pull it back into shape.
- At some place along the curve, the campus condition will deteriorate to the point where it will impede or block program delivery (this is the point where, metaphorically, the campus villagers show up at your house, in the middle of the night, with torches and pitchforks).

Here is where all of this pays off. The executive group is at a crossroads and must make a decision. They must answer the question "Is this current condition acceptable?"

If the answer is yes, Adjust chart input variables (**Decision Chart 2**) to equal a funding level that achieves equilibrium and maintains the status quo. The executive group sees the chart respond to their decision as you adjust the input variables.

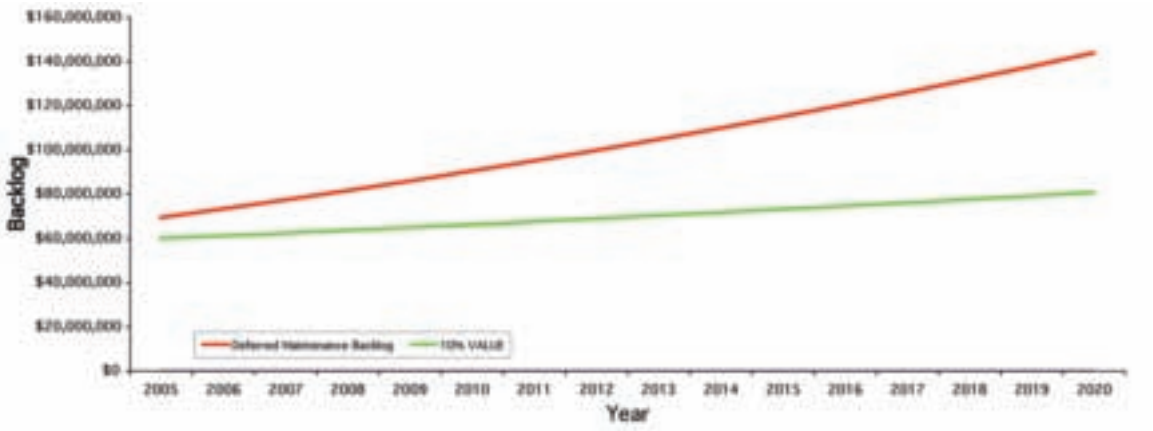
If the answer is no, improve the current condition

Adjust chart input variables (**Decision Chart 3**) to a funding level necessary to improve the aggregate campus condition. The chart displays a one-time infusion of funds, and a long-term maintenance account increase to hold the benefit achieved by the one-time infusion. Funding to produce this result is immediately know and available for approval.

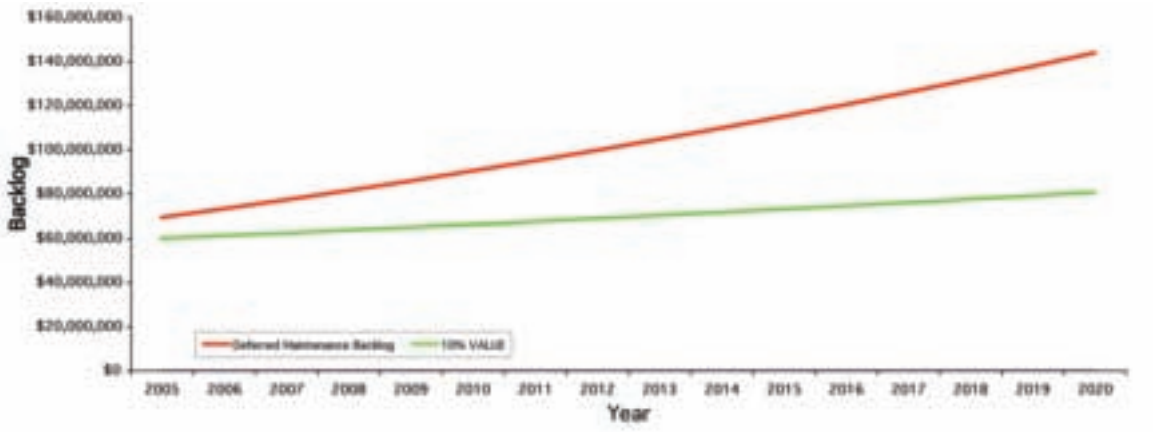
What happens if the deferred maintenance budget is cut?

You never know when you may get an invitation to attend a meeting to discuss budget cuts. Once the spreadsheet is set up, it can be used to emphasize the dramatic increase in the backlog if a minus figure is placed in the budget cell (**Decision Chart 4**).

DECISION CHART 1



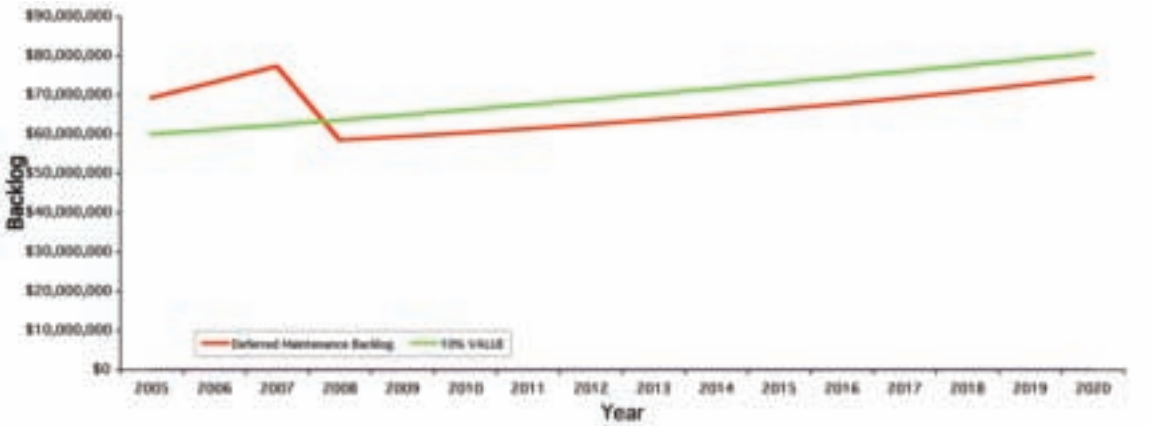
DECISION CHART 2



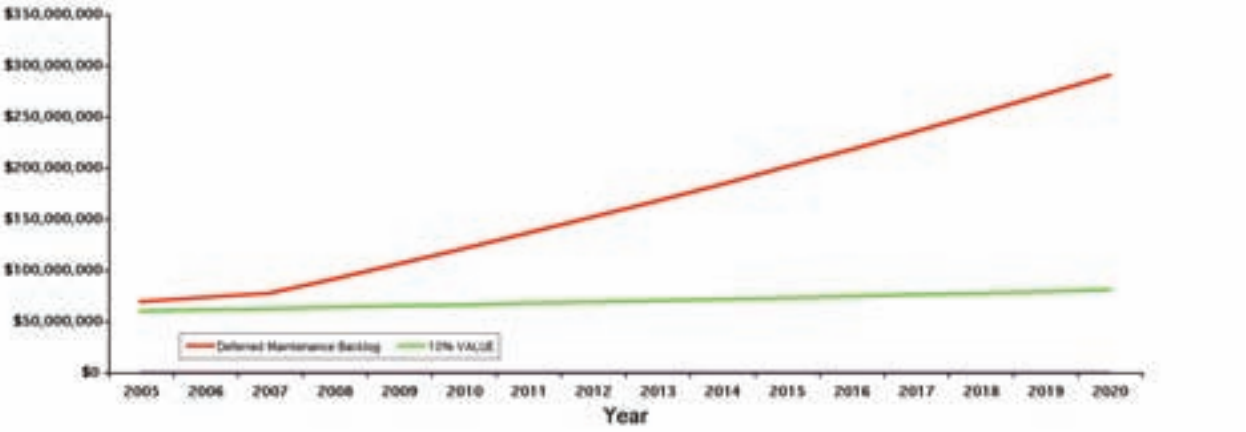
Some Obvious Limitations

- The campus building profile cannot be a collection of buildings that are all the same age. In this case, all deferred maintenance will be due at approximately the same time. Aggregate analysis is of no value. Even with a diverse inventory, the analysis has to address the possibility of a large block coming due at the same time. The analysis should also keep and eye on what happens just outside the time window of the study.
- Deferred maintenance has to be funded early enough to catch the backlog before it is at death's door.
- There has to be acceptance of the premise that systems and equipment will be run to near failure. Textbook service lives are out the window. Empirical information on how many decades you can actually get out of systems is the guideline.

DECISION CHART 3



DECISION CHART 4



Summary

- When the phrase "based upon assumptions" is uttered in the middle of a boring management report, all is lost. Moving from assumptions to empirical brings relevance to the discussion.
- Calculating the UDR helps navigate the murky waters of replacing "expected service lives" with "elastic service lives."
- Empirical analysis can yield factors that stand up and talk about your specific institution. It compels answers to questions about real conditions.
- If the FCI is a vague value and benchmarking it only runs into trouble, what good is it? Its value is in knowing what it is when your executive group says "good enough."
- Predicting the future, in front of the eyes of the executive group, is all that is needed to ask the compelling question "Is the current campus condition acceptable?" To aid decision making, an interactive chart can instantly display the impact of different funding levels.