The Status of Deferred Maintenance at South Carolina's Public Colleges and Universities, Update 2003

Introduction

Deferred maintenance is defined as the upkeep of buildings and equipment postponed from an entity's normal operating budget cycle due to a lack of funds (Cato 3). Accumulated deferred maintenance results primarily from two causes. Under funding of routine maintenance is one cause of neglect that allows minor repair work to evolve into more serious conditions. The problem is further compounded by choices made during austere financial times when routine maintenance is often deferred in order to meet more pressing fiscal requirements. Another cause is the failure to take care of major repair and/or restore facilities or building components that have reached the end of their useful life.

In South Carolina, the decade of the 90s brought declines in the percentages of funding received by higher education institutions. Recommendations for state appropriations for public colleges and universities are calculated to cover the Educational and General (E&G) operating expenses of the institution, including routine maintenance of facilities. Since 1990, average public college and university appropriations, as a percent of Commission on Higher Education (CHE) recommendations, have ranged from a high of 87.7 percent (1990-91) to a low of 54.5 percent (2002-03). Without sufficient funds to cover operating costs, institutions have chosen to defer routine maintenance in favor of more pressing instructional needs. The cumulative effect of deferred maintenance is a significant problem for South Carolina's higher education institutions today.

Background

Concerns about the level of deferred maintenance led the CHE and the Budget and Control Board (B&CB) to conduct a study of deferred maintenance in 1993. A professional research analyst was employed to direct a study of deferred maintenance needs at South Carolina's state-owned facilities in 1993. The study, *Deferred Maintenance, An Analysis of South Carolina's Facilities Portfolio*, was completed in 1994 and identified approximately $170 million in deferred maintenance. Data for the study was gathered by surveying the institutions using criteria designated by the Association of Higher Education Facilities Officers (APPA). State and institutional administrators considered the methodology used in the 1994 study to be fair and objective. Based on this study, CHE adopted an implementation plan for the elimination of the identified backlog of deferred maintenance. The plan, which required an appropriation of approximately $42 million per year for four years, was never funded.

In February 2000, CHE approved a proposal to conduct a study of deferred maintenance at South Carolina public colleges and universities. The Commission amended its 2000-01 budget to include a request for an additional $300,000 to be used for conducting the study. However, funds to conduct the study were not appropriated. With no additional funding to conduct a new study, CHE asked staff to determine the viability of updating the 1994 study.

A review of the 1994 study indicated the methodology was appropriate for conducting an update of deferred maintenance for 2002-2003. Using the same framework for analysis as was used in the previous study, CHE and institutional staff began the task of updating the status of deferred maintenance based on fall 2002 replacement costs. The earlier study included all campus

facilities 3,000 square feet or more. It was decided that the update would include all facilities used in Educational and General (E&G) operations, regardless of size, if the state were responsible for maintenance on the facility.

Updating the Status of Deferred Maintenance - Methodology

The technical approach of the study recognized that "each structure consists of a set of major systems such as Heating, Ventilation, Air Conditioning (HVAC), plumbing, electrical, roof, etc. which collectively constitute the building" (Merritt 4). Each of these systems or components has a defined life, cost, current condition, and replacement value that, when aggregated, define the structure's current status (4). In order to develop an estimate of deferred maintenance for a particular building, each system within a building or structure was analyzed. A percentage of total replacement cost was developed for each building component or system. These percentages were based on nationally accepted definitions (Merritt 5). Once the cost of bringing a particular system or component up to satisfactory status was determined, the results were summed to generate the total deferred maintenance costs for that building.

College and university facilities staffs were asked to evaluate the facilities on each campus according to their present condition using the adjustment factors and the 2002 replacement costs per building (RCB) from the Budget and Control Board's *2002 Annual Update Report*. To reduce problems with validity issues, CHE staff provided training sessions and standard guidelines for performing the evaluations. The present condition of each building system was evaluated on a scale of one to five. A one represents "satisfactory" and a five represents "replacement or demolition." The ratings are scaled as follows (Merritt 7):

1-Satisfactory	No capital outlay funds needed during the next five years.
2-Remodel A	Building or system currently adequate; requires maintenance funding not greater than 25 percent of estimated replacement cost.
3-Remodel B	Building or system requires significant modernization. The cost is greater than 25 percent but less than 50 percent of the estimated replacement cost.
4. Remodel C	Building or system requires major rehabilitation. The cost is greater than 50 percent of the estimated replacement cost.
5. Demolition	Building or system should be demolished or abandoned because it is unsafe or structurally unsound. Generally, rehabilitation cost is greater than 75 percent of replacement cost.

Each building's systems were aggregated into a total building value through the use of condition value multipliers. These multipliers represent the system grades as a function of replacement values as defined above. A grade of (1) represents a satisfactory system with no replacement

value costs, so its multiplier is "1." A grade of (5) represents a system that is totally unsatisfactory and must be completely replaced, so its multiplier is "0." The intervening grades represent equally spaced values of replacement costs that must be expended to bring the building or system up to a satisfactory condition (Merritt 8).

The condition value multipliers represent the degree to which each system is less than satisfactory. A building's roof, for example, represents 7 percent of the total replacement cost of the building. If the roof were to receive a grade of 2 (remodel – A), representing renovation costs of up to 25 percent of the cost of a new roof, then that 7 percent would be multiplied by 0.8 (the condition multiplier for that grade), and the result subtracted from the value of a satisfactory roof (7% - 6% = 1%). This value represents the portion of the building's total replacement cost that must be spent to bring the roof to satisfactory condition. The formula is applied to each system and the results are summed to arrive at an overall cost of deferred maintenance for the entire building (Merritt 9).

Table 1, below, presents a summary of the possible system grades and respective condition value multipliers.

Table 1
Condition Value Multipliers

Grade	Condition Category	Condition Value Multiplier
1	Satisfactory	1.0
2	Remodel –A	0.8 ± .1
3	Remodel – B	0.5 ± .1
4	Remodel – C	0.2 ± .1
5	Replace	0.0

Table 2 represents the data for a sample building. Based on the system evaluations, exterior walls, windows, ceilings, and elevators have suffered from deferred maintenance, and life-safety issues need to be addressed. The amount of funding required to restore the sample building to satisfactory condition is $4.8 million.

Table 2 (continued on next page)
Sample Building

System Name	System Avg. Rating	Multiplier x	System % of Building	Current % Value Building =
Foundation	1	1.00	.13	.130
Exterior Walls	3	0.50	.13	.065
Floors	3	0.50	.07	.035
Roof	3	0.50	.07	.035
Interior Walls	3	0.50	.03	.015
Windows	4	0.20	.02	.004
Doors	3	0.50	.01	.005
Ceiling	4	0.20	.03	.006
Heating	2	0.80	.10	.080

Cooling	2	0.80	.10	.080
Plumbing	4	0.20	.08	.016
Table 2 (Continued)				
System Name	System Avg. Rating	Multiplier x	System % of Building	Current % Value Building =
Electric	4	0.20	.08	.016
Elevators	3	0.50	.01	.005
Safety	4	0.20	.05	.010
Design Systems	2	0.80	.09	.072
			1.00	.574 Rating
Final Rating			0.574	
Required Restoration % (1.0 – 0.574)			0.437	
Year 2002 RCB			$11,198,418	
2002 Required Restoration (2002 RCB x Req. Restoration %)			$ 4, 893,709	

Increases in Costs Since the 1994 Study

Increases in the costs of addressing deferred maintenance needs for all E&G buildings can be attributed to several factors.

1. *The rate of inflation.* A deficiency will cost more to repair next year than it would this year due to increases in labor and material costs.
2. *The rate of overall plant deterioration.* Facilities are in a constant state of deterioration. While identified problems are being corrected, other problems occur.
3. *The rate of deferred maintenance deterioration.* Facilities deteriorate at an average of one to two percent per year. When maintenance is deferred, however, the rate of deterioration increases to about four percent per year (Melvin 2).
4. *The lack of sufficient funds for routine maintenance.* During periods of austere funding, routine maintenance competes for funding against the more urgent needs of faculty salaries and instruction costs. Balancing the budget often requires that routine maintenance be deferred.

Certainly the fact that deterioration occurs at a faster rate when maintenance is deferred contributes to the increase. However, the primary cause is the accumulated effect of funding shortfalls over the past decade.

Findings

Based on the institutional evaluations and application of the above methodology, the backlog of deferred maintenance for E&G buildings at all South Carolina public colleges and universities totals $603,622,371. The amount of deferred maintenance per campus ranges from a low of $91,189 at Northeastern Technical College to a high of $150.5 million at the University of South Carolina's Columbia Campus. Table 3 is a summary of deferred maintenance by institution.

Deferred Maintenance Educational and General (E&G) Facilities Based on 2002 Replacement Cost Values	
Clemson University	122,657,496
Medical University of SC	88,007,466
University of SC-Columbia	150,513,637
	$ 361,178,599
The Citadel	22,410,810
Coastal Carolina	21,557,787
College of Charleston	21,700,336
Francis Marion	15,948,281
Lander	8,525,218
SC State	27,408,897
USC-Aiken	1,674,518
USC-Beaufort	2,341,716
USC-Spartanburg	8,354,416
Winthrop	27,976,714
	$ 157,898,694
USC-Lancaster	6,282,452
USC-Salkehatchie	3,423,505
USC-Sumter	6,713,629
USC-Union	437,958
	$ 16,857,544
Aiken TC	7,085,584
Central Carolina TC	4,694,033
Denmark TC	847,810
Florence-Darlington TC	7,916,844
Greenville TC	4,828,978
Horry-Georgetown TC	13,121,116
Midlands TC	5,849,292
Northeastern TC	91,189
Orangeburg-Calhoun TC	1,393,421
Piedmont TC	4,759,877
Spartanburg TC	2,717,765
TC of the Low Country	2,415,019
Tri-County TC	5,541,728
Trident TC	4,259,241
Williamsburg TC	234,319
York TC	1,931,319
	$ 67,687,534
Grand Total E&G Deferred Maintenance	***$ 603,622,371***

Table 3

Summary and Conclusions

Public colleges and universities in South Carolina have campus buildings ranging in age from those constructed in the 1700s to state-of-the-art facilities completed in 2002. Just under one half of total E&G square footage was constructed prior to 1970 (Facilities Statistical Abstract 6, 7). All campus facilities suffer from the effects of age, weather, and heavy use. Failure to provide adequate maintenance results in eventual deterioration and could result in loss of use. However, when compared with the publicity given the construction of a new facility, building maintenance doesn't get much attention. Concerns for health, safety, and the welfare of students are sometimes, but not generally, a principal factor in building maintenance. A more important concern is the visible consequences of neglecting maintenance, which may not be apparent for many years. Once the signs of deterioration become visible, the repair cost likely will be far greater than the cost of preventative maintenance, had it not been deferred in favor of short-term savings.

South Carolina has invested heavily in its physical facilities. Public buildings are among the state's most valuable assets and represent significant taxpayer investments. Planned maintenance and renewal should play a central strategic role in the management of these assets. Yet, required maintenance is often deferred. In the short run, deferring maintenance will diminish the quality of building services. In the long run, deferred maintenance can lead to shortened building life and reduced asset value (Melvin 2).

Good planning for maintenance requires that appropriate resources be allocated on a priority basis. To curb further deterioration of campus facilities, institutions must develop plans for addressing this backlog of deferred maintenance. Although the initial investment will be high, it will generate significant cost savings in the long rum. Unless funds are directed to eliminate the backlog of deferred maintenance, little preventative maintenance is possible because previously allocated funds have been depleted in order to deal with unanticipated system failures.

Deferred maintenance costs for public colleges and universities in South Carolina total $603,622,371. Total annual maintenance requirements for E&G facilities are just over $30.3 million. For over a decade, public colleges and universities have received less than the recommended amounts for funding E&G operations, including routine maintenance. Without corrective action, deferred maintenance costs will continue to increase in direct proportion to the shortfall in annual maintenance requirements.

References

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