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HOME AND CAMPUS CARE



WE have all heard the idiom that owning a house is like owning a money pit. The *Urban Dictionary* defines a money pit as “something of value, which, for some reason or another, has continued to absorb considerable amount of payments due to its continuing failure to live up to expectations.”

Most people consider their house to be worthy of an investment, but if that investment is not maintained it will inevitably deteriorate and lose its value, and likely become a true money pit. The same concept applies to caring for your campus buildings, grounds, and supporting infrastructure. The question is, “Can we apply what we know about the cost of home expenses to campus buildings?”

Many people in the campus community own a house and understand what is required to maintain their investment in that house. They take care of their landscape, do routine cleaning and painting, handle minor maintenance, call for an occasional maintenance technician, and may even do some major repairs themselves. Although they may do these tasks at home, they have probably never considered owning their house in terms of the total cost of ownership (TCO). In a campus setting, TCO is a familiar concept to the institution’s facilities manager, but probably much less so for the campus community and campus administrators. This article takes concepts that many people understand in terms of their house and attempts to put them into context for an institutional setting.

Table 1: Cost of a Typical Residential House

Typical Residential House	
Bldg. Area (Sq. Feet)	2,000
Cost of the House	\$250,000
Unit Cost (\$/Sq. Ft.)	\$125
Property & Bldg.	\$325,000

Table 2: Basic Annual Residential Minor Maintenance Requirements

Annual Residential Minor Maintenance						
Tasks	Frequency	Unit Cost	\$/Hr.	per Year	Maintenance Costs	\$/Sq. Ft.-Yr.
House Cleaning	Weekly	\$100	\$25.00	52	\$5,200	\$2.60
Lawn Care	Weekly	\$25	\$12.50	24	\$600	\$0.30
Furnace	Annual	\$75	\$75.00	1	\$75	\$0.04
AC	Annual	\$75	\$75.00	1	\$75	\$0.04
Snow Removal	As Needed	\$25	\$12.50	8	\$200	\$0.10
Minor Maintenance	As Needed	\$100	\$50.00	4	\$400	\$0.20
					\$6,550	\$3.28



Table 1 summarizes some basic assumptions about the price of a typical residential house. The authors understand that the price of a house and related maintenance costs can vary significantly depending upon its location. The house described in this article represents a house in a medium-sized university town such as Fort Collins, Colorado.

Table 2 summarizes some basic routine residential maintenance tasks and the related annual costs for the house described in Table 1. These basic tasks include such things as weekly cleaning, routine lawn and landscape care, occasional snow removal, heating and cooling system maintenance, and an allowance for other minor repairs. As shown in Table 2, the average cost for these routine tasks is \$3.28 per sq. ft. per year. This example has not included the costs of utilities such as electricity, natural gas, water and sanitary sewer, phone, cable TV, Internet and WiFi, etc.

It is important to keep up with these minor repairs or the result could become catastrophic, with costs three to four times more to restore the asset. For example, in colder climates, ice dams forming on roof eaves is not uncommon. There are ways to prevent or reduce the impact of these ice dams, such as installing insulation or adding heat tape to gutters and eaves; these are relatively inexpensive investments. But if ice dams are not addressed, then water can ultimately leak under the shingles causing ceiling and wall damage. If left unaddressed, these issues can lead to mold problems that not only impact the indoor air quality but are expensive to remediate and repair. Another example is outdoor condenser coils for air conditioners, which need cleaning at least once a year to avoid excessive energy use, utility costs, and early failure.

It is not completely accurate to compare the routine maintenance tasks required for a typical house with those needed in an institutional setting; however the concepts are similar to an extent.

Table 3: Residential Major Maintenance and Building Renewal Requirements for a Typical Residential House



Residential Major Maintenance and Building Renewal						
Project	Life (Years)	Unit Cost (\$/Sq. Ft.)	Project Cost	Average \$/Year	Annual Costs \$/Sq. Ft.-Yr.	Annual Costs % CRV
Exterior Paint	10	\$1.55	\$3,100	\$310	\$0.16	0.1%
Interior Paint	15	\$2.10	\$4,200	\$280	\$0.14	0.1%
Carpet	10	\$6.00	\$12,000	\$1,200	\$0.60	0.5%
Water Heater	12	\$0.75	\$1,500	\$125	\$0.06	0.1%
Appliances	15	\$1.45	\$2,900	\$193	\$0.10	0.1%
Furnace	15	\$1.80	\$3,600	\$240	\$0.12	0.1%
AC	15	\$2.60	\$5,200	\$347	\$0.17	0.1%
Fixtures	20	\$1.00	\$2,000	\$100	\$0.05	0.0%
Windows	30	\$15.00	\$30,000	\$1,000	\$0.50	0.4%
Roof	30	\$4.00	\$8,000	\$267	\$0.13	0.1%
Major Repairs			NA			
			\$72,500	\$4,062	\$2.03	1.6%

For example; we all know how to clean our house and about how much time it takes to do the housecleaning tasks on a weekly basis.

However, imagine that instead of a small family and a pet or two using your house, you invite 1,000 people to visit daily. They walk on your carpet, sit on your furniture, use the bathroom, etc. Think of how much more time it will take to clean your house, maintain the appearance of the carpet, and keep the bathroom cleaned and stocked. The complexity and frequency of such routine tasks under this scenario increases significantly for the same square footage.

Now consider the longer-term costs for owning your house. Table 3 summarizes the typical costs for major maintenance and building renewal for this typical residential house. These costs include items such as interior and exterior painting; carpet replacement; water heater, furnace, and air conditioning unit replacement; window renovation and replacement; roofing replacement; and bathroom and kitchen fixture replacement. As shown in Table 3, these modest costs are equivalent to 1.6 percent of the current replacement value (CRV) of the building. Again, failing to keep up with these expenses will result in accelerated deterioration of the asset.

For example, failing to routinely paint the exterior can result in flaked paint, cracking, and ultimately rotting wood. Once the wood is cracked or rotted, it needs to be filled and sanded or even replaced. Flaked paint must be removed before applying a new coat of paint. These repairs and extra steps increase the cost of restoring the exterior above the cost of simply painting the exterior. And the exterior still needs to be painted after making these repairs.

If we apply the total cost of ownership concepts for a typical residential house to an institutional setting, then we can start to describe the order of magnitude required to properly care for an institutional building. These costs are summarized in Table 4. The first difference is in the cost required to build this typical campus building.

For comparative purposes we have applied the same unit cost per sq. ft. for the annual maintenance costs as we used for the residential house. We have also used the same 1.6 percent of the CRV to calculate the annual institutional building renewal costs. Using these two factors applied to the typical campus building

Table 4: Costs to Own a Typical Campus Building



Typical Campus Building			
		Unit Cost (\$/Sq. Ft.)	% CRV
Building Area (Sq. Ft.)	60,000		
Cost of the Building	\$27,000,000	\$450	
Annual Maintenance Costs	\$196,500	\$3.28	0.7%
Annual Building Renewal Costs	\$438,660	\$7.31	1.6%
Total Maintenance and Renewal	\$635,160		

Table 5: Simplified Total Cost of Ownership (TCO) for a Typical Campus Setting



Typical Campus Setting			
		Unit Cost (\$/Sq. Ft.)	% CRV
Building Area (Sq. Ft.)	6,000,000		
Building CRV	\$2,700,000,000	\$450	
Building Annual Maintenance	\$19,650,000	\$3.28	0.7%
Annual Building Renewal Costs	\$43,866,000	\$7.31	1.6%
Total Maintenance and Renewal	\$63,516,000		

described in Table 4, the annual cost to care for this 60,000-sq.-ft. building is over \$635,000.

Now let's take this concept one step further and look at the entire campus setting. For this comparison we have ignored the cost of the supporting infrastructure such as streets, parking lots, exterior lighting, utility distribution systems, etc. At our house we typically pay for these costs through our local taxes or through our utility rates, which is not always the case on the campus setting. The costs to maintain and renew the entire campus are summarized in Table 5. The annual maintenance costs are still similar to the typical residential house at about \$3.28 per sq. ft. per year; however the annual renewal needs are over three times more than that of a typical residential house (\$7.31/sq. ft. compared to \$2.03/sq. ft.) due to the higher cost of construction for institutional buildings.

Many of the concepts still apply—failure to do routine preventive maintenance and repairs can escalate into expensive deferred maintenance costs, which can affect occupancy and dramatically disrupt the university's mission of education and research. As noted earlier, this comparison does not include the cost of generating or purchasing utilities.

Like a typical residential house, any campus has modernization needs. In your house, if you want to keep up with modern expectations then you may need or want to add granite countertops, solar panels, etc. This concept also applies to the campus setting. Most chemistry buildings built in the 1950s will not meet today's needs for a modern chemistry building even if there is no deferred maintenance on the 1950s building. This same 1950s building, even if it is in good shape, will likely not be as attractive as a more modern science facility. These modernization costs have not been included in the figures and tables above.

WHAT IS YOUR FRAME OF REFERENCE?

This article presents in simple terms the total cost of ownership of a typical residential house compared to that of a cam-

pus building and campus setting. We do not go into detail on issues such as costs for remodels and code compliance; these are best described in the award winning article "The High Cost of Building a Better University" and the related sidebar "Your House on Campus," by Donald J. Guckert and Jeri Ripley King (*Facilities Manager*, May/June 2003).

Guckert and King described the customer's sticker shock over the cost of a campus renovation and their point of confusion where the *institutional* construction world meets the customer's *residential* construction frame of reference. These concepts apply just as well to the institutional total cost of ownership and the

residential frame of reference for the TCO. The costs described in Tables 2 and 3 seem reasonable when considering one's house, but typically many institutions suffer from sticker shock when considering they should budget nearly \$63.5 million annually to care for a 6-million-sq.-ft. campus.

While many people understand what it takes to maintain the appearance and functionality of their house, trying to justify the costs of institutional ownership within a residential frame of reference is not easy. Although the concepts are similar, the dollars needed are indeed worlds apart. Our universities choose to provide stimulating, enriching environments that will serve our students, faculty, and researchers well into the future—and there is a cost related to providing this environment.

Good stewardship involves not only constructing quality buildings that will last; it also requires adequately funding annual maintenance and renewal costs. Simplifying the complexity of the total cost of ownership for an institutional setting in terms of residential ownership may help facilities managers to justify to their administrators what is actually needed in terms they can relate to without overwhelming them with detailed data. We certainly want to avoid our campus buildings becoming money pits that require ever-increasing deferred maintenance dollars. 💰

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