

Flooring Life Cycle Cost Analysis

A life-cycle cost comparison looks at the costs of a product from purchase through disposal and reflects durability and ease of maintenance in addition to initial costs.

Basing a flooring material decision on the initial cost of material and installation alone can end up costing the Owner much more in the long run. The success key is to look at the overall life cycle cost of the flooring options under consideration for the project's common heavy traffic areas.

Resilient flooring refers to flooring materials, which have a relatively firm surface, yet characteristically have “give” and “bounce back” to their original surface profile from the weight of objects that compress its surface. Common forms include:

- *Vinyl composition tile (VCT)*
- *Vinyl tile and sheet*
- *Linoleum tile and sheet*
- *Rubber tile and sheet*

Cleaning costs, including the cost of materials (sealers, finishes, dressings, conditioners, etc.), maintaining the cleaning equipment, labor, and the flooring’s “use life” (number of years the material will be used), are the major variables in a life cycle cost analysis.

To get an accurate assessment of the life cycle cost of different flooring materials, the analysis should be based on the projected total use cost, taking into consideration the following:

- *Initial installed cost (material and installation)*
- *Length of use life (durability and appearance retention)*
- *Maintenance expenses (labor, supplies and equipment)*
- *Removal/replacement if needed*

(footnote 1)

Life Cycle Costs of Flooring (per square foot)

Material	Initial 2009 SF Cost: Material and Installation	Expected Life Span (Years)	Initial SF Cost per Year of Life Span	Average Maintenance Cost per SF/Year for the first 10 years ***	Total SF Cost Over 10 Years	SF Cost of Removal + New Materials and Installation at 15 Years	Average Maintenance Cost per SF/Year for the second 10 years	Total Cost Over 20 Years
	A*	B	C=A/B	D**	E=(C+D)*10	F=A+1x1.73****	G**	H=E+F+(G*10)
VCT	\$ 3.00	15	\$ 0.20	\$ 1.98	\$ 21.80	\$ 6.92	\$ 2.97	\$ 58.42
Linoleum	\$ 6.50	25	\$ 0.26	\$ 1.98	\$ 22.40	\$ -	\$ 2.97	\$ 52.10
Rubber	\$ 7.75	30	\$ 0.26	\$ 1.58	\$ 18.38	\$ -	\$ 2.37	\$ 42.08

* Based on Projected 2009 square foot costs

** Estimated and Escalated

*** Source: Suzanne Barnes, AIA CFM

**** Escalation at 4% per year compounded over 15 years = 73%

Vinyl is the cheapest option for commercial and institutional flooring on a first-cost basis but the most expensive option on a life-cycle basis based on its relatively short lifetime and high maintenance requirements. Flooring installation represents a very small part of total cost when expressed in terms of cost per year of use. Far more important is the annual maintenance cost. Calculating these qualities, together with initial cost, rubber floor has the lowest life-cycle costs. Thus, the initial cost savings from vinyl are counterbalanced by high costs over the life cycle of the flooring.

Life Cycle Costs of Flooring at CRLS

Material	CRLS Resilient Floor Area	Initial SF Cost: Material and Installation	CRLS 2009 Cost: Material and Installation	Expected Life Span (Years)	CRLS Cost per Year of Life Span	Average Maintenance Cost per SF/Year for the first 10 years ***	CRLS Maintenance Cost per Year for the first 10 years	Total CRLS Cost Over 10 Years	Cost of Removal + New Materials and Installation at 15 Years	Average Maintenance Cost per SF/Year for the second 10 years ***	CRLS Maintenance Cost per Year for the second 10 years	Total CRLS Cost Over 20 Years
	Area	SF Cost	A=Area x SF Cost	B	C=A/B	D**	E=Area x D	F=A+(E*10)	G=Area x (SF Cost+1 x 1.73)****	H**	I=Area x H	J=F+G+(I*10)
VCT	229,832	\$ 3.00	\$ 689,496	15	\$ 45,966	\$ 1.98	\$ 455,067	\$ 5,240,170	\$ 1,590,437	\$ 2.97	\$ 682,601	\$ 13,656,617
Linoleum	229,832	\$ 6.50	\$ 1,493,908	25	\$ 59,756	\$ 1.98	\$ 455,067	\$ 6,044,582	\$ -	\$ 2.97	\$ 682,601	\$ 12,870,592
Rubber	229,832	\$ 7.75	\$ 1,781,198	30	\$ 59,373	\$ 1.58	\$ 363,135	\$ 5,412,544	\$ -	\$ 2.37	\$ 544,702	\$ 10,859,562

* Based on Projected 2009 square foot costs

** Estimated and Escalated

*** Source: Suzanne Barnes, AIA CFM

**** Escalation at 4% per year compounded over 15 years = 73%

As shown above, there is approximately \$2,400,000 in savings at CRLS, when you compare the 20-year life cycle cost of rubber tile versus VCT (Vinyl Composition Tile).

In addition to the above cost savings, rubber flooring offers the following environmental advantages:

- *Some Rubber Manufacturers like Nora Flooring are completely free of polyvinyl chloride (PVC), plasticizers and halogens. Floor coverings that do not contain any PVC are safer, especially in case of a fire. They guarantee that no hydrochloric gas is produced and that corrosive hydrochloric acid does not result from contact with the water used to extinguish the fire. In addition, no toxic halogenerated dioxins or furans are produced.*
- *The dimensional stability of some rubber flooring products also means that the floor covering will not shrink. As a result, dirt built up in opened up joints will not occur.*
- *Rubber floor coverings that are not made from recycled tires can also feature lower VOC emissions, the off-gassing from products that occurs under specific conditions. Low emission levels help flooring products meet the indoor air quality (IAQ) standards that characterize green products.*
- *Some Rubber flooring manufacturers use solvent-free, environmentally friendly dispersion adhesives during installation, which further ensures good IAQ.*
- *Ease of maintenance also adds to the appeal of rubber flooring. It doesn't require harsh cleaners. In most instances, cleaning consists of simple dust and wet mopping with a mild pH-neutral cleaning product. Unlike many resilient floor coverings, rubber floors do not need to be waxed or sealed, because of their dense, nonporous surface. Labor costs also decrease, as do the costs of cleaning supplies.*
- *In addition to maintenance considerations, another green advantage of installing rubber flooring is the extended life cycle of the product. Rubber flooring has an average life of 30 years. The durability of rubber reduces the need for frequent removal and disposal of the product, thus conserving natural resources.*

(footnote 2)