



FINISH FLOOR SYSTEM ANALYSIS

Introduction:

When conducting a finish floor system analysis, it is important to consider not only the type of building the floor is going into, but also what space it is for. School buildings have a variety of different types of spaces, which all have different functions. These functions need to be considered when deciding on a type of floor system to use. For example, the gymnasium and the library are going to require two different types of floor systems. In this analysis, I am going to compare the strengths and weaknesses of vinyl composition tile versus epoxy terrazzo flooring for the classrooms and corridors.

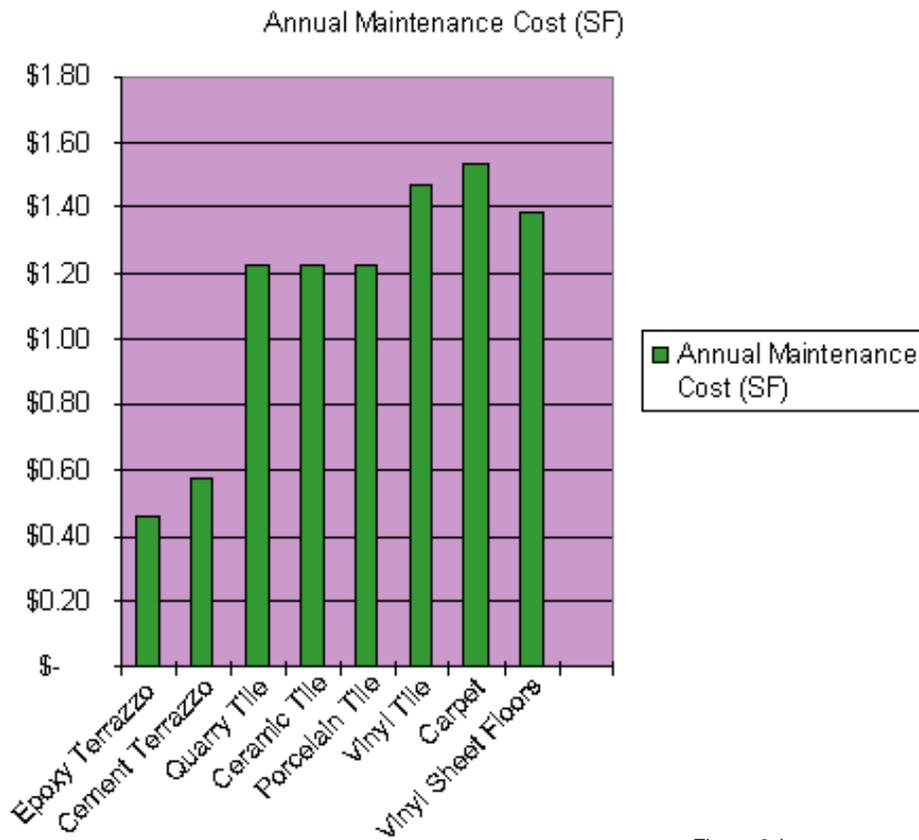
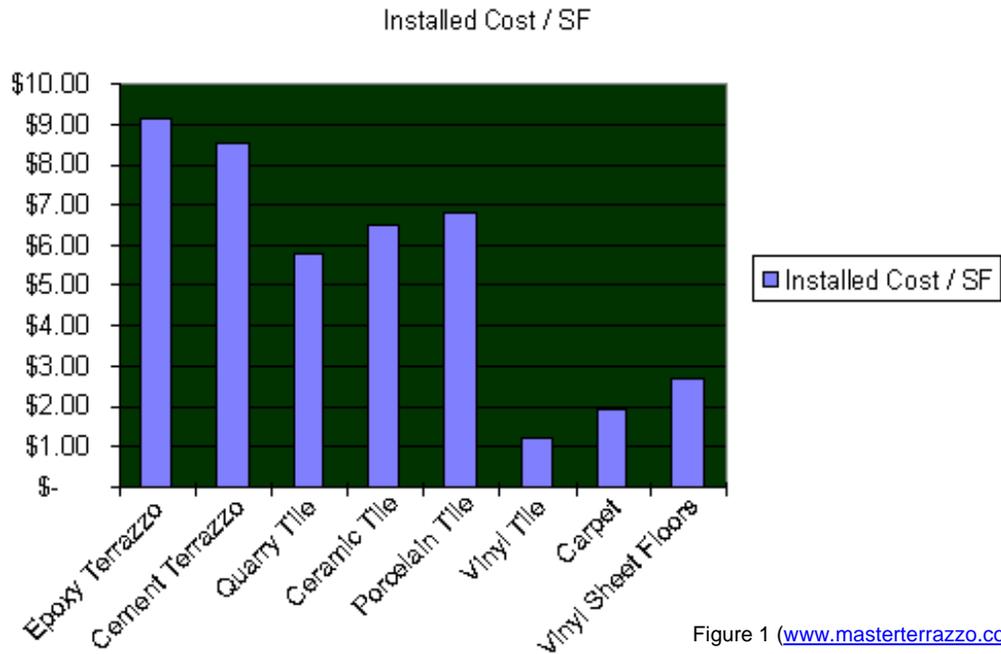
Besides the function of the space, there are several other factors which must be considered. Installation cost, installation time, maintenance and upkeep, and life expectancy of the product must all be looked at when considering which floor to use in a space. Some products have higher initial cost, but have a much shorter life expectancy and vice a versa. Installation time is an important factor, because using a different system can prolong the project schedule.

Background:

The following charts are comparisons of several different types of finishing floor systems. Figure 1 is a comparison of installed costs per square foot of each product. Figure 2 is a comparison of the annual maintenance costs per square foot of each product. Figure 3 is a comparison of the life expectancies for each product. All three of these factors coincide with one another, with respect to the total cost over the performance period of the building. As you can see, vinyl tile has a very low installation cost, but has a very high annual maintenance cost. On the other side of the spectrum is epoxy terrazzo. Epoxy terrazzo has a very high installation cost, but to compliment this it has a very low annual maintenance cost. These two factors, along with the life expectancy of the



product, are all very important to consider when designing a finishing floor system for the building space.



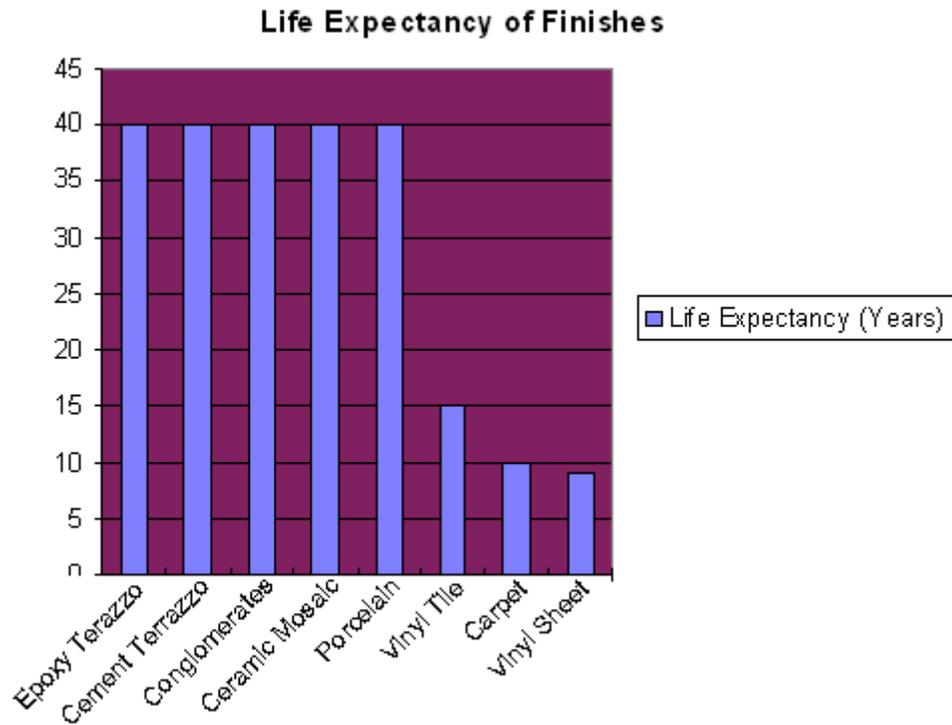


Figure 3 (www.masterterrazzo.com)

When combining installation cost, annual maintenance cost, and replacement cost due to the predicted life expectancy, the total project cost can be looked at over an extended period of time. This comparison tells the owner how much the product will cost over the performance period of the building. This analysis should be the deciding factor when comparing two different types of finishing floor systems. Figure 4 is a comparison of the installed, maintenance, and replacement costs for several different products.

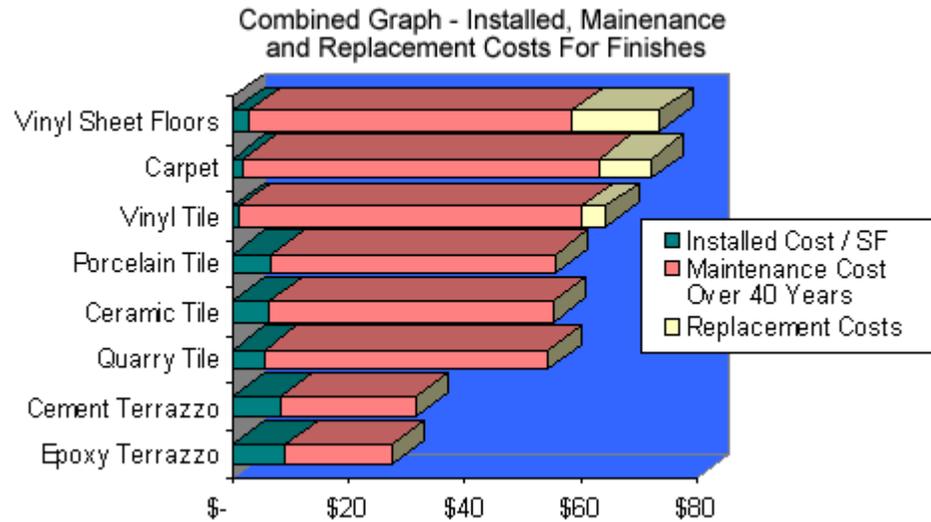


Figure 4 (www.masterterrazzo.com)

Problem Statement:

For the Penn Valley Elementary School renovation, the proposed finishing floor system was vinyl composition tiles in the classrooms, corridors, and cafeteria and carpet in the library. Both of these products have low installation costs and are not labor intensive. The problem here is not seen upfront, because the owner thinks he is saving money by using these low cost products. The problem will exist 20 to 40 years down the road, when these floor systems have to be replaced after years of maintenance and upkeep costs.

Solution: Epoxy Terrazzo vs. Vinyl Composition Tile

I am proposing to install an epoxy terrazzo flooring system in the corridors and cafeteria, instead of vinyl composition tile. These are both high-traffic areas, so they will be required to withstand a lot of wear and tear. An epoxy terrazzo floor is much more durable than a vinyl composition tile (VCT). Although the epoxy terrazzo has a much higher installation cost compared to vinyl composition tile, the life expectancy is more than double that of the VCT. In addition, the vinyl



composition tile has a much higher annual maintenance cost compared to the epoxy terrazzo. So as the VCT appears to be a better deal, the epoxy terrazzo will prove to be more cost effective throughout the performance period of the building. The following compares these two floor systems over a long term period.

Epoxy Terrazzo vs. Vinyl Composition Tile					
CORRIDORS and CAFETERIA: 14,364 S.F.					
	Cost / S.F.	Installation Cost	Annual Maintenance Cost / S.F.	Life Expectancy	Long Term Cost (After 50 years)
Terrazzo	\$12.95/S.F.	\$186,014	\$0.45/S.F.	50 years	\$509,204
VCT	\$2.98/S.F.	\$43,805	\$0.90/S.F.	20 years	\$777,795

Over a period of 50 years, the cost of VCT is considerably higher than the cost of terrazzo. If using the terrazzo floor, there would be a cost savings of \$268,591 after 50 years. The reason for this is not the initial installation cost, but rather the life expectancy and the annual maintenance cost of the two different products. The VCT floor system has double the annual maintenance costs per square foot compared to the terrazzo floor. Also, the life expectancy of the terrazzo floor is two and a half times longer than the VCT. That means within the 50 year period, the VCT had to be ripped out and re-installed two additional times compared to the terrazzo floor which is a one and done installation fee for the long term time period.

The other aspect to consider is the impact that these finishing floor systems have on the project schedule. The epoxy terrazzo floor requires a two man crew, and it would take the crew 72 days, or 14 weeks, to install in the corridor and cafeteria. The vinyl composition tile can be placed with a single man crew and would take 29 days, or 6 weeks, to install. The terrazzo requires an additional 8 weeks to install and would negatively impact the project schedule. There would



be a cost associated with this longer installation period, but the long term durability of the terrazzo floor would compensate for this cost over the performance period of the building.

Another issue with the terrazzo floor is the extra curing time. Terrazzo requires extra time to cure before it can be completed with a finishing coat. The floor can not be disturbed or walked on until it is finished. Conflicts could arise where other contractors are not able to access certain parts of the building, especially when laying the corridor floors. The construction manager would have to coordinate this issue with other trades, to minimize conflicts and to minimize the impact of the schedule. The problem would not be as severe at Penn Valley Elementary School, however. Most of the typical classrooms have exterior doors. This would give contractors an option of completing work in the classrooms, while the terrazzo is being installed in the corresponding corridor. Accessing these classrooms through the exterior doors will help eliminate negative impacts on the schedule, as well as reducing conflicts between contractors.

Carpet vs. Vinyl Composition Tile

I am proposing to install carpets in the classrooms, instead of vinyl composition tile. Both products are ideal to use in classrooms and are easy to install. The difference maker is the long term cost. VCT has a slightly smaller initial cost, but has a higher annual maintenance cost. Carpet has somewhat of a higher installation cost, but has a lower annual maintenance cost. The costs are fairly close when looked at in a short-term duration, but over the performance period of the building there is a significant difference. The following chart shows carpet versus VCT over a 50 year period.



Vinyl Composition Tile vs. Carpet					
CLASSROOMS: 36,200 S.F.					
	Cost / S.F.	Installation Cost	Annual Maintenance Cost / S.F.	Life Expectancy	Long Term Cost (After 50 years)
VCT	\$2.98/S.F.	\$107,876	\$0.90/S.F.	20 years	\$1,952,628
Carpet	\$3.38/S.F.	\$122,718	\$0.70/S.F.	15 years	\$1,757,872

Although the life expectancy of carpet is not as long as VCT, the annual maintenance costs compensates for that over the 50 year period. If using the carpet floor system, there would be a savings of \$194,756.

The schedule would not be severely impacted by either product. Both floors only require a one man crew. VCT would take a total of 73 days, or 15 weeks. Carpet can be installed in the classrooms in a total of 54 days, or 11 weeks.

Conclusion:

For high traffic areas of the school building, corridors and cafeteria, epoxy terrazzo is the way to go. There are higher initial costs compared to VCT, but the paybacks will overcome those costs over the performance period of the building. The only set back would be more time spent on coordination between the other trades due to the installation process. The project could be slightly prolonged, but there are significant savings. For the classrooms, carpet will be used. Carpet can be installed more quickly than VCT, and has a lower annual maintenance cost. Carpet is much cheaper over a 50 year period.