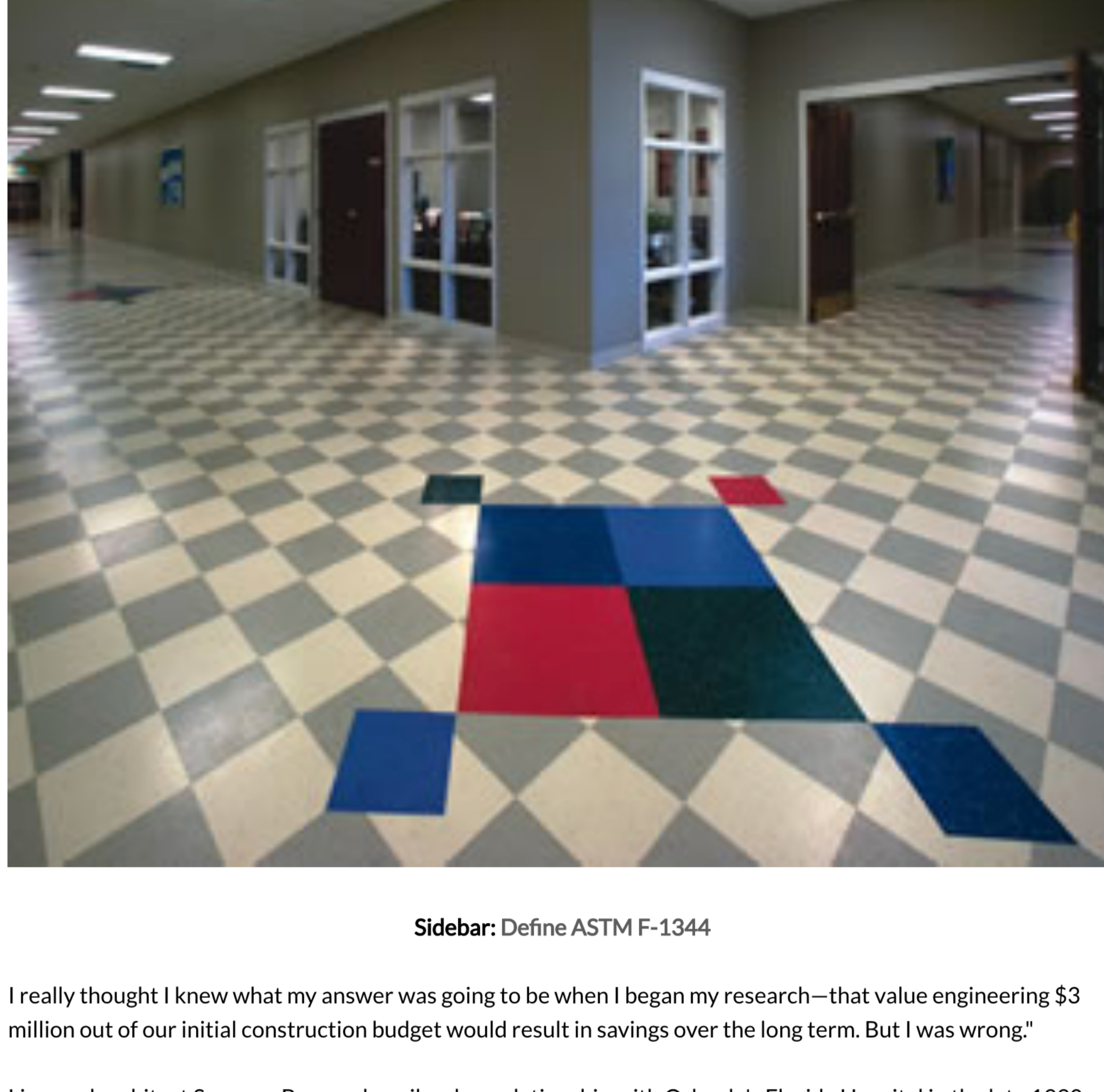


Rubber Flooring: Value and Beauty for the Long Term

June 1, 2008



Sidebar: Define ASTM F-1344

I really thought I knew what my answer was going to be when I began my research—that value engineering \$3 million out of our initial construction budget would result in savings over the long term. But I was wrong."

Licensed architect Suzanne Barnes describes her relationship with Orlando's Florida Hospital in the late 1990s, where she was the assistant director of design, as "part architect, part facilities manager, part owner." A major construction project was running over budget, and Barnes and her colleagues were asked to sort through what to cut and what to keep in the original specifications.

"What we were faced with was a \$28 million project that we needed to get down to \$25 million. We were thinking like most people would—'let's value engineer it out and make it fit the budget.' In situations like this it seems the first thing to go is always the higher-end floor, and by switching to a lower cost floor we could make our budget," explains Barnes. "To justify making this change, though, I thought I'd do a quick comparison study of the life-cycle costs of one floor over another, which would prove we were doing the right thing by 'value engineering' our first choices out of the mix with lower cost options.

"It was a verdict in search of evidence, but the evidence didn't add up in the end. I ran the numbers, and importantly, surveyed our floor maintenance personnel, staff, architects, suppliers, engineers, users, even hospital patients. They let me know in no uncertain terms how hard it is to keep a vinyl floor clean and polished, how much bacteria is sitting in those carpets, etcetera. They had very strong opinions because they were the ones who had to live with the choices we were making. In the end that's what my responsibility was as a specifier—to put in something that was easy to maintain and would look good for the life of the installation. This was a hospital, not a property that was going to be sold in five years, so I needed to be sure we were making the right choice."

Barnes' earliest assumptions had indicated that the products that were cheapest to buy and install were the cheapest to maintain, and the options with the higher initial costs were actually more costly over the life-cycle of the floor.

"We were all wrong with our initial assumptions and even in our initial research! Further research proved that the opposite was true ... the cheaper floors were actually more expensive over time, and vice versa," she adds. "When I presented my initial findings to our president and the board of directors, the response was 'Oh my!' I knew there were people in the room who had built their careers by cutting costs in this fashion, and I was challenging that whole mindset. A decision was made to continue with the research and testing of various floors."

RUBBER FLOORS RAISE THE BAR

This research, eventually compiled into a presentation called "How to Make Business Decisions for Facility Flooring," became Barnes' life for the next several years. In the end her team concluded that several floors met the criteria for a high-use installation (and few installations are used as intensely—24/7—as a hospital), including rubber flooring, no finish vinyls and some other low-maintenance floors. They could also easily be the most aesthetically pleasing choice if the color and pattern are chosen wisely.

"Rubber flooring was a prime candidate because we knew it lasts longer, looks better, is much more comfortable to stand and work on, safer to walk on, safer to fall on, and it requires much less effort and upkeep," says Barnes. "It's more expensive initially, but you definitely get what you pay for; in the long run it pays for itself.

"I think one problem is, people don't look at rubber as a 'quality product,' adds Barnes. "They want something that looks like an expensive finish, but expensive floors all have their own issues. Marble cracks, wood absorbs moisture and bacteria, terrazzo is too hard of a product, and is difficult to install and maintain correctly. Then they think, for 'x' dollars I can put in carpet. Carpet looks good when you first open, but then the owner has the challenge of trying to keep it clean.

"I compare this to living with all-white house interiors. People love to look at a white furnished house, but have they ever lived in a house with white carpet, with kids and dogs? No. Most people know better. They don't want the hassle of trying to keep it clean, a battle they know they'll eventually lose anyway."

Because of the nature of hospitals, the study focused mostly on hard floors. They have the best life-cycle costs, don't "ugly out" after five years, don't retain stains and smells, appear to be more sterile, and don't take as long to dry. Carpeting was included in the study for comparison's sake because it is such a familiar option.

In assessing relative costs, Barnes' research pitted the life-cycle costs of rubber flooring against VCT, linoleum, carpet, sheet vinyl, and simulated wood—all from several manufacturers. Four methodologies were used:

- Initial cost
- Replacement cost
- Maintenance/labor costs
- Total life-cycle cost replacement

To drive the comparisons home, Barnes expressed the life-cycle costs as a multiple of the initial cost of installation.

LIFE-CYCLE REPLACEMENT AND CLEANING COSTS			
Per 1,000 square feet installed			
PRODUCT	COST/SF	CLEAN/15 YEARS	LIFE-CYCLE COST FACTOR (MULTIPLE OF INIT. COST)
VCT	\$1.20-1.50	\$24,313	17
SHEET VINYL	\$2.47-5.00	\$25,879	8
NO-FINISH SHEET VINYL	\$4.00-5.00	\$15,640	4
RUBBER	\$4.00-5.50	\$ 8,095	2
CARPET	\$6.66-25.50	\$21,982	9

Source: How to Make Business Decisions for Facility Flooring, Suzanne R. Barnes, 1999

As you can see, VCT had the lowest initial cost at \$1.20-1.50 per square foot, but its maintenance costs over 15 years were the second highest overall, and 17 times the initial installed cost. The only flooring that was more costly to maintain than VCT was sheet vinyl. Carpeting had the second highest life-cycle cost multiple at nine times the original investment, followed by sheet vinyl at eight times. The carpeting had to be replaced three times over the 15-year period.

In the end the supposedly "cheapest" floor, VCT, was a very expensive choice, and a more expensive floor, rubber, was actually the cheapest at a little over half the cost of the next closest option. Even at five years, Barnes noted in the study, the payback for some of the more expensive floors had disqualified the cheaper floors.

"Our original methodology had been: Design, budget, install, and then suffer-suffer the consequences," explains Barnes. "We thought we were saving \$3 a square foot by using VCT everywhere, but our methodology was all wrong. We studied these floors in patient rooms, cafeterias, lobbies, corridors, and nurses' stations. After the study, we only considered carpeting for lobby areas; corridors, because of its acoustic properties; nurses' stations, for comfort; and cafeterias, for aesthetic reasons. This of course meant we would be paying a higher price for better quality carpet."

When it comes to recommending flooring for commercial installations, Barnes says the best value is in low-maintenance hard floors.

"Theoretically, in a large hospital over 15 years' time, we could save millions of dollars by installing floors that do not require finishing," she says. "In the case of VCT, initial pennies saved could mean millions lost. Rubber seems to be the best product overall. It doesn't move over years, [or] decay or wear like most other products."

The longevity of floors in a hospital setting is particularly important, notes Barnes, because it's just not feasible to shut down a unit at will to replace a worn or damaged floor.

"There is no extra capacity these days; there's nowhere else for patients to go. As it is, I've seen patients in beds in hallways because they're waiting for a room to open up. You can't shuffle people around to refinish or replace a high-maintenance floor."

ORGANIC DESIGN, ENVIRONMENTAL ADVANTAGES

"Our study also looked very hard at what kinds of designs make the most sense for hospital applications," says Barnes. "I personally tested very dark, white, and light- and medium-colored floors, with the assumption that the darker floors would fare best. The darks and lights all show too much dirt or lint and tend to look dirty right away. The best looking floors are a medium color, and have organic shapes, like paisley.

"Most architects like really repetitive things, so everything looks very geometric. But spills and stains are not geometric, they're organic. So are traffic patterns. In a hospital, of course, you don't want to hide the bacteria, but you do want to hide stains, like a coffee spill or chemo fluids. Complex organic patterns do a great job hiding these, as well as scuff marks. As a result of the study we stopped specifying solid-color floors."

Rubber flooring manufacturers have expanded their product lines over the years, and designers can now choose from a wide range of texture and color combinations. For clean rooms, and areas with the strictest hygiene requirements, rubber sheet flooring allows designers to create seamless installations. Further, most adhesives used to install rubber floors contain an antimicrobial agent for added protection against mold and bacteria, and rubber tile has a natural resistance to bacteria and fungi when tested in accordance with ASTM G 21. Some rubber tiles also meet chemical resistance specifications, in accordance with ASTM F 925.

A further benefit to specifying rubber floors is, of course, the environmental advantages of rubber as a material and how it contributes to the LEED® certification process. Where other flooring options present inherent environmental challenges, rubber as a material has helped buildings achieve Platinum LEED status.

Rubber flooring can impact a LEED project from a variety of angles. Many rubber tiles are constructed of as much as 90 percent post-consumer waste when manufactured using post-consumer recycled tires. Also, rubber tiles are partially compounded using natural rubber (renewable resources from the rubber tree). And no-wax rubber floors contribute to environmental friendliness by not putting harmful refinishing chemicals back into the environment and requiring less use of water to maintain.

ENVIRONMENTAL IMPACT

the specification of rubber flooring. Rubber tile contains no PVCs and will not emit vinyl chloride, plasticizers, asbestos, or CFCs. Air quality is a major concern and may be affected by emissions from the flooring material itself, as well as from the adhesives used to install the floor and surface coatings and maintenance materials like wax and strippers. The low-maintenance nature of rubber flooring helps specifiers minimize these environmental pitfalls.

Several rubber manufacturers have conducted independent indoor air quality tests and have received certification from nonprofit organizations such as CHPS (Collaborative for High Performance Schools) which follow the same protocol as other organizations, such as GREENGUARD, FloorScore and Green Label Plus. A list of materials for school construction that are environmentally sound has been prepared by CHPS and is available at www.chps.net.

Rubber floors can also be engineered with antimicrobial properties, making them more resistant to food service hazards like grease and oil. The grease- and oil-resistant feature can be achieved by adding a topical coat or by incorporating the mixture into the formula of the rubber tile. Topical coats can wear off, but the formulas that are incorporated into the rubber assure that the tile continues to perform as it was intended.

"Rubber is my favorite type of floor for commercial installations," concludes Barnes. "Every day I see other flooring materials that should never have been specified for those applications. I've seen terrazzo in grocery store produce sections. Terrazzo is very slippery when it gets wet—which happens often in a produce section—and is very unforgiving if you should fall. Rubber would be a much better choice. Airports are also a great candidate because of the unbelievably heavy traffic they get. Even corporate offices would benefit from rubber floors, for noise control, comfort, design, and durability. The Europeans seem to be ahead of the U.S. in this respect.

"If you're specifying floors for long-term durability, or if safety, low-maintenance and environmental friendliness are your goals, rubber should be at the top of your list."

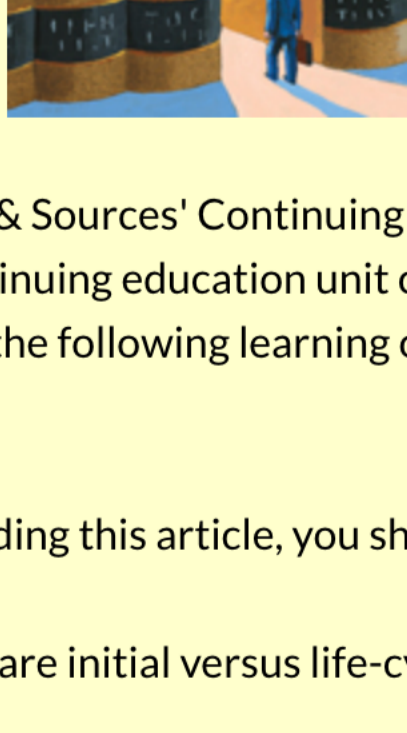
Define ASTM F-1344 [back to top](#)

ASTM developed the F-1344 Standard specification for Rubber Floor Tiles in 1991, which replaced the old Federal Specification #SS-312b. These standards provide dimensional and performance criteria for product acceptability.

ASTM F-1344:

- Permits a thickness tolerance of + .015"/- .005" for pattern tile and +/- .005" for smooth tile.
- Permits a hardness rating not less than 85 when tested in accordance with ASTM D-2240 Durometer (hardness).
- Provides performance requirements in the areas of static load limit, resistance to short-term chemical resistance, resistance to heat, and abrasion resistance.

Learning Objectives: [back to top](#)



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After reading this article, you should be able to:

- Compare initial versus life-cycle costs for different flooring materials.
- Explain which floors require the least maintenance in high-traffic applications.
- Discuss the hygienic and safety benefits of rubber flooring.

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