

CRACKING IN CONCRETE

Not to belabor the point but there's more information I want to share with you regarding substrate issues particularly the condition of concrete and especially cracking. Cracking in concrete is inevitable. It's been said that with every truck load of concrete four cracks arrive with it. Unless there is control joints that allow for concrete slab movement the cracks will occur in a random fashion. Cracks can be caused by soil and fill settlement beneath the slab, expansion and contraction of the structure and other environmental factors. A properly reinforced slab will be more forgiving with a little settlement but if the fill is not properly prepared, the slab not properly reinforced or compromising events such as flooding disturb the fill, large cracks can occur. Minor cracks can be addressed and repaired. Major cracks, which indicate a larger problem may necessitate extreme measures such as the slab being removed and replaced. The geographic location of the building may also have an influence on cracks. Colder climates may see more cracks than warmer climates. This is a very simplified look at concrete cracking and it certainly does not attempt to address the complexity of the issue. Our concrete experts in our seminar can help with that. So what's the point relative to installing flooring material on concrete?



Cracks in the concrete indicate movement of the slab. Any flooring material installed on the slab will be affected by the movement. The greater the slab movement the more flooring problems you'll have. Small cracks may not be mirrored into the flooring material. Larger cracks may suck the material into the space creating a low area which follows the entire crack. Carpet may mask this occurrence more subtly and stone or ceramic floors exhibit it more obviously. For example, several years ago, in a hospital, a radius was shot and drilled into the concrete for the curved reception desk and ceiling feature. The slab drilled into was severely affected by moisture and actually had a volume of water beneath it. As a result the holes drilled for the radius sucked the patch material and the VCT into the depressions that were formed. Slab movement and cracks can cause bubbles, wrinkles and depressions, cracking and splitting of flooring material. Vinyl tiles will react differently than sheet vinyl products but hard surface flooring in general will be more visibly and adversely affected. Broadloom carpet and carpet tile can also be affected but the nature of these products and the patterning they may have, could mask the underlying condition.



If cracks appear and the flooring installed on them is affected in any of the ways previously described, the repair can be extensive and expensive. The flooring material will have to be removed and the cracks in the concrete repaired by someone who specializes in this corrective action. That's the easy part. It may be that the entire slab has to be broken out and replaced. Trying to repair severe cracking with a filling agent may only be a temporary fix. If the slab moved enough to create cracks the size of fissures you can bet it's not finished moving. Like tectonic plates in the earth the slab will move at some point again.



HEAVING IN CONCRETE

The slab can also heave at the perimeter if it curves up or if there is an event on the outside of the space that causes the concrete to move. You can see in the accompanying photos that the ceramic tile has lifted at the perimeter of the rooms. The affected tiles can't just be removed and replaced. The cause of the substrate lifting has to be resolved and repaired first and then the flooring material replaced. None of these activities are easy or inexpensive. Many of the causes for concrete issues, including cracking, being experienced today are the result of construction schedules moving at light speed and the "dam the torpedoes, full speed ahead mentality" that seemingly thinks it can defy the laws of physics. The cost to correct flooring failures as a result of this type of thinking far outweighs the fast paced construction schedule. Why is it that you don't have time to do it right, or the budget, but find the time and money to fix afterwards? Does this make sense? Given the "Green Mentality" permeating everyone's thinking of not wasting resources, this flies in the face of conserving. You couldn't plan to waste resources any better. Remember what I've said before about green flooring issues, "Get it in the door and keep it on the floor." That's not going to happen when you try to defy the odds of flooring failures occurring and it's going to get worse.



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MAKE SURE YOU LOOK OUTSIDE

The installation of over 8,500 feet of vinyl tile curling at the edges in a two and a half year old church surfaced one and a half years after the installation. The church also had other flooring materials that were unaffected; tile flooring installed in the front areas, carpet glued directly to the substrate in two inner hallways and in the sanctuary aisles and engineered wood installed in the sanctuary under the pews. None of the flooring materials were showing any type of failure except the vinyl tiles. The first thought, always, is that the flooring material is failing and 1. Must be defective or 2. The installation is the problem. As is often the case, neither was the cause. By lifting up loose tiles it could be easily seen and felt that the substrate beneath them was damp. Because the tiles are non – permeable material, they trap the moisture beneath them causing the adhesive and

adhesion to fail and thus allow the tiles to lift or curl. Again, as always, the law of physics is at work; that is, for every



action there is an equal and opposite reaction. The moisture in the substrate compromises the adhesive, this loosens the tiles, the moisture, in the form of a vapor, has to escape and does so along the perimeter of the tiles causing them to lift and curl because they are no longer adhered along the edges. So certainly when first seeing this condition it's going to seem like the tiles are defective or the installation is failing.



Example of trapped moisture under a non – permeable material



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Where do you look for the cause? In this case we had to look outside. Moisture had to be influencing the concrete substrate and it was by intrusion. The grading on the outside of the building was not pitched completely or properly away from the building envelope. The down spouts for the gutters were right next to the building foundation which was slab on grade and did not drain the runoff water from rain far enough away from the building. In addition, the splash blocks which the down spouts emptied onto, were actually pitched back towards the foundation. So when it rains the water rushing down the gutters hits the splash blocks and, though they are facing in the right direction but because they are not properly elevated, the water is directed forward but also overflows backwards towards the slab - so obvious as to be oblivious. This was the underlying cause of the vinyl flooring installation failure. Before the flooring failure can be addressed the drainage issue has to be corrected. Why didn't the other flooring materials fail? The carpet glued directly to the substrate is permeable and moisture vapor emission can pass through it but eventually, the adhesive may be compromised by the alkalinity coming with the moisture from the concrete and a failure could result. The wood flooring and the ceramic tile are further from the edge of the foundation and moisture may not have migrated that far under the slab. The mortar bed for the tile is permeable enough that moisture vapor will pass through it and, being a cementitious bond, there is no adhesive to fail. All this said; when a flooring failure similar to this occurs on grade make sure you look outside the building envelope where you're likely to find the cause.

CURLING CORK TILES

This is a short story on one of the problems you can have. We'll defer more in depth information to a future issue on cork from our resident cork expert, for a more in depth explanation of cork and its performance and installation characteristics in the commercial environment.

Cork is very popular today for several reasons, not the least of which is how "green" it is. One of the problems often experienced with cork flooring tile in particular, is curling at the edges. This condition is actually common and normal for this material but if you don't understand this inherent characteristic you're bound to suffer as a result of not

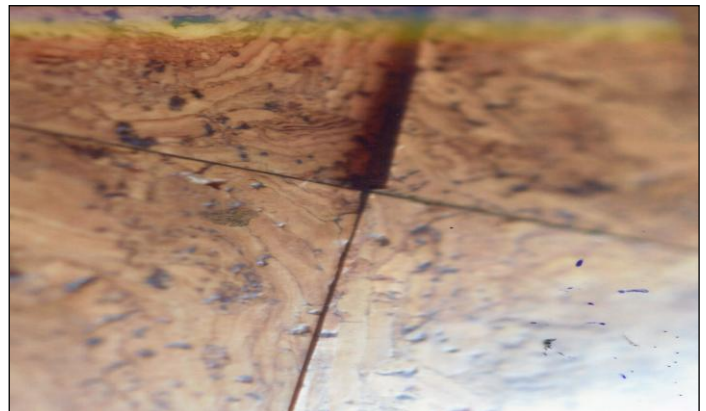


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understanding it. The three basic tools required to install cork are a knife, hammer and water based contact type adhesive. Unless this type of adhesive is used the chances of the tile edges curling are pretty high. The adhesive also has to be applied to the back of the tile and to the substrate – like putting peanut butter on both sides of a sandwich. This creates an instant bond to the substrate virtually eliminating curling edges. It may be necessary to use the rubber mallet to hammer down the edges so they don't lift. Once you accept this and the unique installation techniques of cork flooring in tile form especially, you shouldn't have any problems. Of key importance is making sure the installers selected for installing cork flooring have the experience necessary and a working knowledge of the product so installation issues and failures can be avoided. If you go with the lowest bidder or don't qualify the experience and skill of the installers tasked to install cork flooring, any failure that results will be your fault. If you're reading this know that any GC or installation contractor should be able to furnish the end user, client or architect with the installation firms qualifications. The last thing you want to have happen is for a bunch of inexperienced individuals messing up any of your flooring material installations.

As always if you need help with a flooring failure, problem, specification, issue, dispute or fix call us; we always know the answers.



The new **Velcro Brand Carpet Protector** is ready to go. This product takes the place of clear plastic coverings with pressure sensitive adhesive that have created a host of problems for the industry. The new **Velcro Brand Carpet Protector** is made for use on loop and cut and loop carpet; the vast majority of commercial carpet. Bentley Prince Street is the first carpet manufacturer to offer this unique product.



Systems like EnviroSTIX for hard surface and hard backed flooring materials and FreeLay for carpet are systems that will help prevent the failure of flooring installations. There is more technology coming, most of which we are involved with. We'll keep you informed to help you. In the meantime understand that temperature and humidity have a profound effect on flooring materials and the integrity of their installation. If you control the temperature and humidity in the space it will maintain the integrity of the floor covering and the installation.

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