Installation Expertise with Tim McAdoo

When Concrete Decides to Move

Concrete, like all other materials, will slightly change in volume when it dries out. In typical concrete this change amounts to about 500 millionths. A concrete slab one hundred feet across can grow and contract over half an inch. The reason that contractors put joints in concrete pavements and floors is to allow the concrete to crack in a neat, straight line at the joint when the volume of the concrete changes due to shrinkage. As it hardens, the cement and water begin to shrink, and the stresses created by this shrinking cannot be overcome by the small amount of strength developed by the young concrete.

One factor that contributes significantly to shrinkage is mixing the concrete too wet. If excessive water is introduced into the mix, the slab will shrink more than if the correct amount of mix water were used. This is because the additional water takes up more space, pushing the solid ingredients in the mix farther apart from each other. By doing so, a weaker solution is created. When the excess water leaves the slab, the solid particles have larger voids between them. These voids make the concrete weaker and more prone to cracking.

Probably the single most common reason for early cracks in concrete is plastic shrinkage. When the concrete is still in its plastic state (before hardening), it is full of water. This water takes up space and makes the slab a certain size. As the slab loses moisture while curing it gets a bit smaller. Because concrete is a very rigid material, this shrinking creates stress on the concrete slab.

Control joints are actually contraction joints because they open up as the concrete contracts or gets smaller. They are simply grooves that are tooled into fresh concrete, or sawed into the slab soon after the concrete reaches its initial set. Control joints create a weak place in the slab so that when the concrete shrinks, it will crack in the joint instead of randomly across the slab. For a crack control joint

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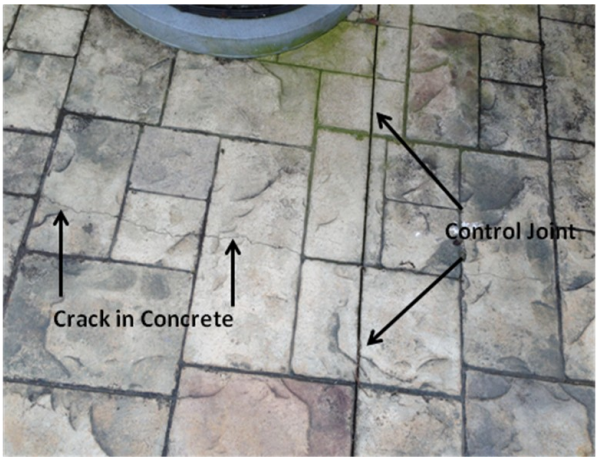
to be effective, it should be ¼ as deep as the slab is thick; a six inch thick slab would require 1.5 inch deep joint. If the control joint is not deep enough, the concrete can crack near it instead of in it (see photos below).



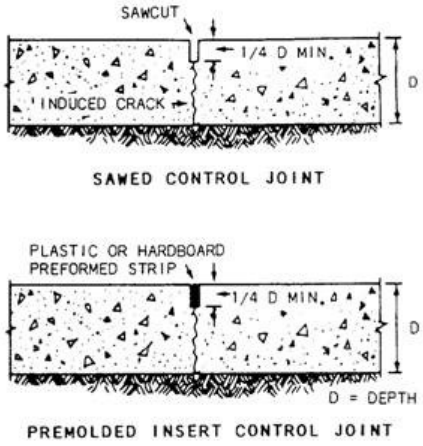
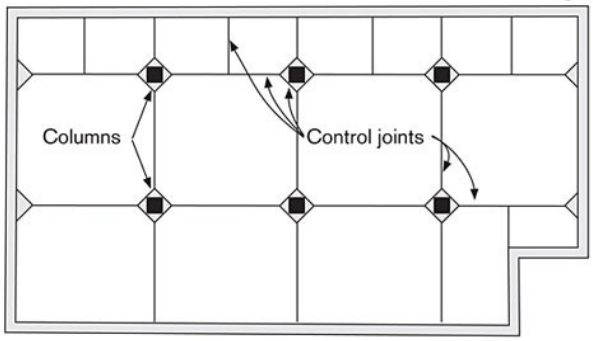


Figure 3



Plan of Control Joint Patterns

An **expansion joint** is a point of separation, or isolation joint, between two static surfaces or two different pours of concrete. The Expansion Joint allows each slab or surface to move independently of one another. This is why Patching Compounds, Self Leveling Underlayments, and Glue Down Flooring are not to be installed directly over the Expansion Joint. If you are required to, you more than likely will be back on a semi yearly basis repairing the flooring. The entire depth of the Expansion Joint is filled with some type of compressible material such as tar-impregnated cellulose fiber, or closed-cell poly foam. Whatever the compressible material, it acts as a shock absorber which can "give" as it is compressed. This relieves stress on the concrete and can prevent cracking.

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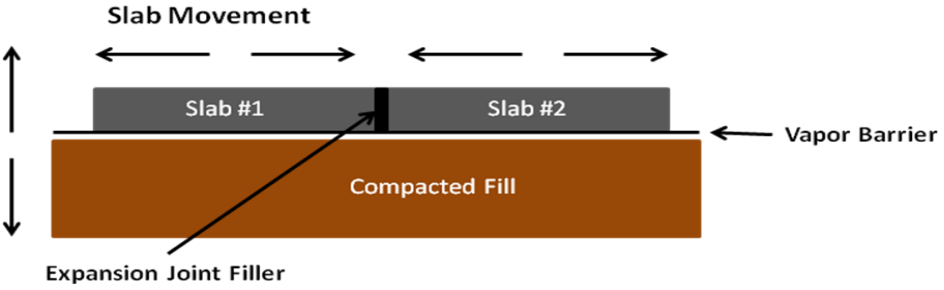

Saw this VCT installed over an Expansion Joint in a store. The cracked VCT ran the entire length of the store. As you can see with the color difference in the VCT, the tile has been changed probably several times and continues to crack as the slab continues to move through seasonal change. **Note; this slab is at least 15 years old and still has movement.**

Actual expansion joints or other moving joints with elastomeric fillers are designed to absorb movement in concrete slabs. Cementitious underlayments, patches and resilient flooring installed across expansion joints often crack or buckle when the slabs move. The Resilient Floor Covering Institute does not recommend glue down flooring products to be installed across expansion joints or isolation joints. Expansion joint covers are available for use with various floor coverings and should be specified by the architect.

I have seen installers dig out the elastomeric fillers and patch the joint flush with cementious patches. But when the concrete slabs move, the patch fails as will the glued down flooring.

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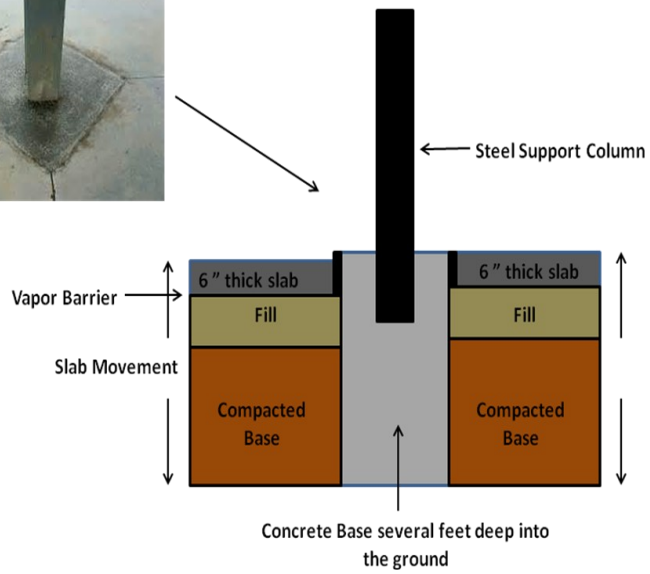
VCT Buckling over moving Expansion Joint

VCT Breaking around Support Column



Support Column is set on a concrete base several feet thick and does not move. Remainder of the slab is only 6″ thick and is affected by seasonal ground movement.

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Another factor which contributes to cracking is ground movement brought on by freeze/thaw cycles. During such cycles, the frozen ground can lift as much as several inches, and then settle again when the ground thaws. If the slab is not free to move with the soil, the slab will crack as will any glue down flooring.

So, how do we get around these issues? Per the flooring manufacturer, an expansion joint cover should be used. If you are told to install over these types of active joints, put it in writing that you are not liable for tile cracking per the flooring manufacturers' recommendations and are not responsible for repairs.

Suggest a floating floor structure that is designed to float over these active joints. You may see some show through of the joint, but the flooring should not fail.

About Tim McAdoo:

Tim is a certified instructor for Armstrong/Bruce, Avaire, Konecto and Starloc products an has been a member of the Armstrong Installation Training Team since 1984. Tim has highly developed installation skills and qualifications that have been combined over his 32 years in the floor covering industry. Tim is privy to all the latest innovations and techniques used in the installation of their products.

We are sure you will find your skills improved after attending one of his installation courses.

To view a complete list and register for one of Tim's installation trainings, click here on the QR or visit: http://www.jjhaines.com/for-customers/installation-training/

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