

June 25, 2003

Topic: Resilient Flooring on Concrete Floors
Divisions: 09650-3 and 03300-2

What Happened...

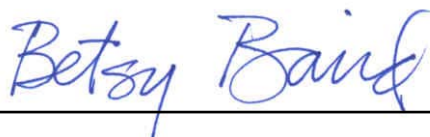
Over the past 10 years, O'Neal Construction has experienced a variety of flooring failures. Each failure has in common that the material was non-breathable and installed with adhesive on concrete. Failed materials include specialty sports flooring, vinyl tile, sheet goods and even carpet tile.



DISSOLVED GLUE UNDER A DECORATIVE DIAMOND IN VINYL SHEET GOODS.

**THE ALKALI IN THE CONCRETE REACTED WITH THE WATER SOLUBLE GLUE AND
LEACHED THE PIGMENT FROM THE FLOORING –
THAT IS THE PURPLE ON THE BACK OF THE DIAMOND.**

The flooring manufacturers all stated that our floors were too wet - the specs all gave us the mix designs for the concrete and vapor barrier location and the installers were complying with our schedule demands. So, what did we do? We held a flooring seminar, inviting O'Neal Construction management, a senior superintendent, 3 architects, 2 subcontractors, a representative from the adhesive industry and 2 manufacturers' reps.



Betsy Baird, AIA
Director of Quality Control

We discussed the following issues at length:

- MOISTURE CONTENT IN CONCRETE – Is 3 lb /1000 sf / 24 hr attainable & is it really required?
- VAPOR BARRIER LOCATION – Should it be below the slab or below the sand?
- CURLING AND CURING – Do you go for the dry floor or the flat floor? What about compatibility with curing compounds? A good vapor barrier below the floor may help the adhesive but it also promotes floor curling.
- SEALING – Can you surface seal the concrete?
- SCHEDULE – Is there time to wet cure for a week, wait 5 months to get the floor to an acceptable moisture content and then keep the owner off the new flooring for a week (this is recommended by the flooring manufacturer)?
- WATER SOLUBLE GLUE – Can we just change to epoxy and not worry about the floor not adhering? Glues are not what they used to be – and they don't work.

The End Result...

We will be monitoring closely the next installation, and installing the entire system – from the sub-grade to vapor barrier to curing methods and moisture testing – per the flooring manufacturer's exact specifications.

We have not been doing it wrong all these years. There have been changes in the flooring, adhesive and concrete industries. Opinions have changed regarding vapor barrier location – which affects curing and curling, aggregate types and mix designs – which increase porosity of concrete, changes to low or no VOC (volatile organic compound) adhesives – which decreases adhesion properties, and the wide spread use of curing compounds – which must be removed prior to flooring installation.

RULES FOR ALL VINYL FLOORING PRODUCTS

These rules are a work in progress. Please report any failures or hardships you encounter with any item so this list can be modified and kept current.

1. Select the manufacturer of the flooring as soon as possible.

Don't rely on generic or old manufacturer's literature. Get it new for each project. Have this in hand when planning your concrete floor placement. Know the requirements.

2. Install underfloor drainage.

This is imperative. Especially consider the value engineering choice of trading a spread footing, which has the excavation ready for an interior drain tile, and the trench footing. When the trench footing option is selected, money needs to be put back in to trench for a sub-slab drainage system.

3. Use at least 10 mil vapor retarder.

Visqueen is not waterproof; therefore it is a vapor retarder. 10 mil is a minimum thickness and Visqueen is the minimum standard of material. Low density materials deteriorate over time so high density should be used. It should meet ASTM E1745 and have a permeance of less than 0.3 perms. If there is any question of a water source on site, this MUST be changed to a completely waterproof material – a vapor barrier.

- Locate the vapor barrier under the granular fill if there is a need to control curling.
- Locate the vapor barrier on top of the granular fill if there is vinyl tile and vinyl backed resilient sheet or carpet.

4. Lap joints 6” and tape all seams and penetrations.

Make sure this is in the quote and in the scope of work. Inspect prior to the pour and repair any tears or holes.

5. Turn up wall at perimeter and bulkheads.

When it turns up the wall, we will be able to see it after the floor is poured. The flooring installer will have to trim this but at least we all know the vapor barrier was there.

6. Set wire mesh on blocks to the top 1/3 of the slab or use fiber mesh in the concrete.

Controlling cracking is essential with the vapor barrier immediately under the slab and the top 1/3 is where the wire holds the concrete together to reduce shrinkage cracking.

7. ACI recommends using a low-water-content concrete and water reducing admixtures.

This reduces bleeding, shrinkage, and curling of concrete. Check the tickets for < 90 minute delivery from the batch plant and maintain consistent slump, in the 3” to 4” range. These measures reduce the permeability of the hardened concrete.

8. Place concrete floor slabs with the building enclosed.

This reduces floor moisture problems resulting from rainwater.

9. Cure with a wet covering for 7 days.

This means install burlap, Visqueen or other covering that will hold the moisture in the slab and slow the curing process for the first 7 days. Continuous sprinkling or ponding are not recommended for floors to receive low-permeability coverings because these methods may allow standing water under the slab – introduced through cracks.

10. Test for moisture BEFORE installing flooring.

Be forewarned. The most recent tests taken on a project took a full 5 months to achieve acceptable moisture content.

**** Don't forget – this is a work in progress.*