

Detecting and Preventing Defective Joint Filler Installation Work

The photo at right was taken a mere 10 months after completion of a new warehouse. The owner's material handling vehicle wheels were suffering excessive wear/damage, he insisted the general contractor repair all defects and replace the filler. The estimated cost was \$45,000. In any given year, we inspect 200-300 floors across the country. Our surveys indicate that more than 50% of all filler installations are partially or totally deficient. In some cases, the deficient work was due to ignorance of proper procedures, but more were the result of intentional cheating. The most common deficiencies we find are as follows:

Inadequate Joint Cleaning

Fillers must bond directly to bare concrete if they are to maintain sufficient adhesion to be effective in providing proper load transfer and protecting joint edges. The only sure way to obtain clean joint walls is by dry saw-cutting, with the saw blade hitting both inner joint walls. Manual scraping of the joint with rakes or hand tools, or blowing out joints with compressed air is not adequate.



Joints should be cleaned mechanically using a saw (preferably dustless) equipped with diamond or abrasive blade to expose clean, bare concrete along joint walls.

You can identify inadequate cleaning by extracting a cured sample of filler and determining if dirt/debris was embedded in the liquid filler before it cured.



Inadequate Filler Depth

To provide proper load support, fillers must be firmly seated on the bottom shelf of the joint. If fillers are placed over backer rod or debris, they can be sheared-off their bonding surface and driven down into the joint, leaving joint edges exposed. Both ACI and PCA mandate full depth filling in saw cuts 2" or less in depth. When a filler drops below the surface, it is usually a sign of less-than-full filler depth.



Above: Filler placed over a compressible foam backer rod to reduce material usage. Filler must be placed at full depth to provide joint edge protection.

Below: Shallow filler "punched down" into joint.



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Verifying Filler Depth

To verify filler depth, simply use a 1/8" bit and drill through the filler. If the bit has uniform resistance until it hits the joint base, it is likely installed full depth.



But, if the drill bit plunges through at any stage, or shows variances in resistance, shallow filling is probable and filler samples should be extracted from joint for examination.

Concave Profile

A properly installed filler will allow vehicles to cross the joint and exhibit no signs of impact. Fillers that cure in a concave profile allow impact, which will eventually lead to joint edge spalling. The only means of ensuring a flush filler profile, is to overfill the joint, allow the filler to cure into a solid, then razor off the overfill. The best way to determine an acceptable flushness level, is to run a vehicle across the joint and determine if impact is detected. An alternate method, is to run a straight edge across the joint and look for any void below the straight edge. See *Technical bulletin T8* for more info.



Above: The finished profile of a semi-rigid filler needs to be flush with the floor surface, if it is to provide joint edge protection. A concave or "dished" filler profile provides no joint edge protection, and leads to joint edge deterioration (spalling).

Below: Straight edge reveals void between floor surface and filler profile across the joint.



Filler Substitutions

There are more than 100 semi-rigid fillers on the market. The quality of these fillers varies dramatically. Some installers have been known to submit a quality filler on paper, but then actually use a lesser quality (cheaper) filler. Substitutions are very difficult to detect, especially if filling is done during hours when no supervision is present. If you suspect substitution has occurred, extract a sample of cured filler and send it to us. We will conduct a lab analysis at no cost. On many occasions, we may be able to have one of our tech people visit the jobsite and provide an immediate opinion.

Preventing Deficient Filler Installations

There are a number of strategies you can employ to avoid having your next project become one of the 50% we estimate receives a deficient installation:

1. Provide detailed filler specifications/bid documents. Both should clearly address acceptable fillers by name, joint cleaning methods, and filler depth requirements (See *Technical Bulletin T3* for more information).
2. Require the use of a manufacturer recommended or approved installer. While the requirements to become an approved installer may vary from one filler manufacturer to another, no manufacturer will knowingly recommend or approve an installer who routinely performs defective installation work. Mandating a recommended/approved installer on your project vastly increases the odds that the work will be performed by an experienced installer familiar with the joint cleaning/installation methods required to ensure a proper joint filler installation.
3. Review expectations with all involved parties. The filler manufacturer should be involved early in the process, to work with the owner, general contractor, and the installer to review installation guidelines and observe joint cleaning and installation standards on the project prior to the commencement of the installation work.

If you suspect any deficiency on your project, contact Metzger/McGuire promptly. Correction of deficient work after building completion is far more difficult due to logistical challenges. If you have a project that requires joint filling work, please involve us early on and let us make certain that your client receives the top quality filler installation work needed to ensure maximum joint durability throughout the service life of their floor.

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