

## FAILURES

# Cracking the Case of the Tiles



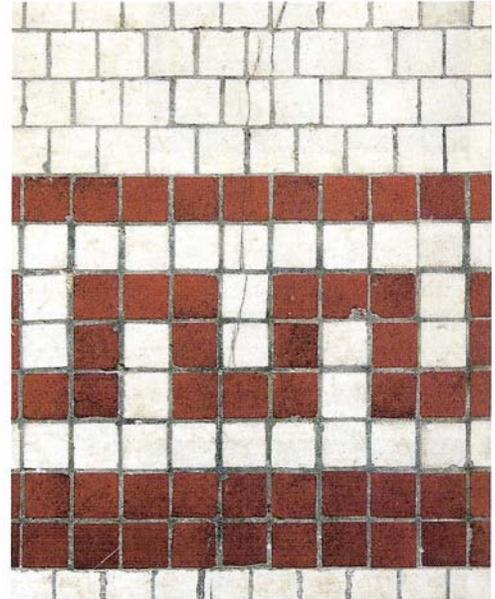
Gerald "Jerry" Zakim, CSI Member Emeritus, is a prominent consultant to the construction industry with more than 50 years of experience. A member of various ASTM committees, he is a life member of NACE International and has chaired the American National Standards Institute (ANSI) A 108 Waterproofing group. Zakim is a patentee in his field, specializing in tile and stone, concrete, sealants, finishes, and moisture protection. He serves the Tile Council of North America (TeNA) as an expert/inspector in their Team USA program, as well as being a recommended expert by the National Tile Contractors Association (NTCA). An active arbitrator and mediator, he has delivered consulting services in legal matters for both plaintiff and defense. Zakim can be contacted via e-mail at [szakim@optonline.net](mailto:szakim@optonline.net).

Serious delaminating and cracking failures can occur in ceramic tile or dimensional stone over either plywood (*e.g.* tongue-and groove or sheets tightly placed) or oriented strand board (OSB) stored on grade, unprotected, and outside prior to use. In exterior storage, these substrates go through normal hot- and cold-temperature cycling; however, wetting and drying leads to expansion, contraction, and deterioration.

This author has been on job-sites where tiles have let go of their substrates or begun to crack. In many cases, the plywood or OSB was installed, followed by immediate tile and stone placement without anyone checking to ensure the surface was in suitable condition. (Moisture meters are recommended.) Lack of mortar bond of tile to the substrate, with mortar attached to the back of the tile, is a clear indicator of wet plywood or OSB. This means the material's surface was compromised by exposure. When cracking was present, it indicated shrinkage had occurred, causing dimensional changes in the substrate due to tensile forces beyond the capability of rigid tile or stone.

Such defects are often found after construction has been completed and the site has been landscaped and occupied. Detective work, luck, and hard questioning of the participants throughout the entire construction process are the best ways of discovering the failure's cause.

On one project, this author inspected exterior precast concrete planters that had been thoroughly waterproofed and flood tested before tiles were applied. During (and



In some cases, cracked tiles can indicate shrinkage caused dimensional changes in the substrate.

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after) heavy rains, the planters would flood, overflowing the surrounding areas and creating a slip !fall hazard. The owner ordered the general contractor to call a meeting of all participants to discuss and resolve this problem.

The gathering took place in a windowed conference room overlooking the areas ",;here the planters were located. During the meeting, heavy rains commenced and the planters overflowed. The sprinklers then came on, creating a condition beyond the capacity of the planters' construction-in effect, a flash flood. The solution was simple: install a rain detector so the sprinklers do not activate when it rains. The sighs of relief from those at the meeting were loud and clear.

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