

## Water Staining on Limestone ◀ ▶ My Opinion

*Have a technical question? Check MIA's Dimension Stone Design Manual VII first. If you can't find the answer there, contact MIA's Technical Director, Chuck Muehlbauer, at [technical@marble-institute.com](mailto:technical@marble-institute.com). This FREE service is for MIA members only! (Non-member charge: \$85/hour) As a courtesy to other members, please limit phone conversations to ten minutes per call. All opinions and advice provided by Chuck Muehlbauer or anyone else from MIA are provided as general information only. MIA assumes no responsibility and shall not be liable for any damages resulting from your use of this information. Any information provided by the MIA is the exclusive property of MIA and shall not be disseminated, republished, or reproduced in any manner without the prior written consent of MIA.*

**Q:** We have some staining in an interior limestone floor installation. It appears to be simply water staining, but it doesn't dry out.

Some have suggested that the stains could be the result of a fountain leaking, but the fountain is 30 feet away from the stained area, so wouldn't it be reasonable to rule that out as a possible cause?

**A:** My experience with fountains is that they are available in two types: Those that leak, and those that will. And I have been involved in investigations with symptoms almost exactly as you describe.

As illogical as it sounds, water can migrate well below the stone surface over considerable lateral distances, and then wick back up to the surface at another location. I would still consider the fountain a prime suspect in this scenario, despite the fact that no symptoms exist in the immediate area surrounding the fountain.

**Q:** An architect wants us to install marble pavers for a residential patio, but the installation requires that they be set on pedestals. Will marble work in this system, or should pedestals only be used for the harder rocks, like granite?

**A:** It isn't so much a question of what type of stone is being used, but rather a question of the stone having the required strength to safely span between the pedestals.

The stress in the stone is influenced by the load (which will be

code dictated in this case), the span, and the thickness of the stone slab. This must be compared to the allowable stress for the stone, which will be its flexural strength divided by the appropriate factor of safety.

Using marble may likely require a greater slab thickness than what would be required for granite, because marbles generally have lower flexural strengths, and due to greater variability in strength, we typically apply higher factors of safety in their design.

But as long as a marble with a high degree of soundness is selected, a safe installation can be easily designed. Regardless of the stone type used, there are some varieties in every stone family that are simply unusable in this application.

**Q:** Why are there so few sizes shown for anchors in the MIA's *Dimension Stone Design Manual*? That book would be a lot more useful if the anchors were fully dimensioned so we could just plug the details into our shop drawings.

**A:** The size of the anchorage components cannot be predetermined for a project without knowing a number of parameters specific to that project. The details shown are representative of reliable attachment methods that have been traditionally used in the industry.

Determining the actual sizes and frequency of the various components would require knowing a lot of information specific to the job

(loads, stone strengths, panel sizes, etc), so there is no way to include that information in a generic detail.

**Q:** We're pricing a project that requires 3" thick marble with refrigeration underneath to be used for ice cream preps. We don't have any slabs this thick. We are considering epoxy laminating 3 pieces that are 3 cm thick, or would it be better to epoxy laminate 4 pieces that are 2 cm thick because that would be closer to the 3" that they want?

**A:** It is doubtful that either solution will satisfy the specification. Since there is refrigeration underneath the slab to keep the top surface cool, the design relies on the thermal conductivity of the stone to transfer heat from the top surface down to the refrigeration coils.

The epoxy lamination layers will create a "thermal break", which will significantly limit the thermal conductivity of the assembly. I would encourage you to look for a vendor that can provide the marble in the 3" slab, as originally specified.

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