Q: We have moisture problems with a stucco exterior. What are the possible causes? —E-mail

A: AWCI’s Technical Manual No. 15, “Evaluation of Three-Coat Portland-Cement Plaster (Stucco),” identifies four major causes of water penetrating the envelope of a stucco clad building:

Loss of “cohesive value.” If the several layers of plaster begin to come apart, or lose cohesive value, there is a much greater probability that cracks that allow water intrusion will occur.

Gravity. Gravity causes rain water to run down the stucco surface, and if there are any openings in the surface, the water will find it and enter the building envelope. In many cases, the moisture will be diverted out of the building envelope by the weather-resistant barrier.

Kinetic pressure caused by kinetic energy. The manual explains (far better than I could): “Kinetic energy is the energy caused by a moving body due to its own weight and motion. Two raindrops of equal mass will create a kinetic pressure different from each other if one of the two raindrops is driven faster than the other by wind or some other external force.” In other words, wind-driven rain is more likely to penetrate cracks or other openings the surface than a windless, free-falling rain.

The pressure differential from inside to outside. When air pressures are lower on the inside of a structure than on the outside, water can literally be sucked into the building. This condition may result from exhaust air being removed faster than replacement air can enter. Not only does this condition lead to moisture intrusion, it can also contribute to excessive dust accumulation.

To address these conditions, the installation of weather-resistant barriers is recommended on all weather-exposed surfaces to protect against intruding moisture. The model building codes require that exterior openings be properly flashed and integrated into a properly installed weather-resistant barrier. Such a system provides a means of diverting intruding moisture to the exterior of the building.

Q: How often should control joints in 1-inch cement plaster on a concrete-masonry-unit wall occur? —E-mail

A: The control joint, when properly placed, provides a pre-weakened place for the crack to naturally occur. Ideally, a control joint is placed in such a stucco surface using the appropriate trim element fastened to the CMU; however, a groove or cut in the surface of the stucco serves the same purpose. An expansion joint is a joint that allows movement between either large building elements of the same material, like long runs of masonry or cement walls, or where two different types of building material, like wood framing and masonry, meet. The expansion joint accommodates the independent movement of each of the elements without causing damage to the other element that doesn’t expand and contract at the same rate.

The Northwest Wall and Ceiling Bureau’s Portland Cement Plaster Stucco Resource Guide recommends such a control joint every 200 square feet. However, CMU walls frequently have expansion joints occurring roughly every 20 linear feet (although the formula for determining the exact placement of an expansion joint involves size of the joint, temperature changes, mass of the wall and enough other variables to keep an engineer occupied until lunch). So if the stucco is applied to a CMU surface with expansion joints every 20 feet, the stucco should start and stop at those joints and should not need additional control joints unless the wall is over 10 feet tall.

About the Author
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