

Few people would disagree that the house below looks better with the stone veneer than it would without it. But looks are deceiving in this case. Beneath a portion of the stone on this 4 year old house, there is significant framing decay.

fyi

Adhered Masonry A Ticking Time Bomb?

Nothing beats the warmth and attractiveness of stone masonry on a building. For the past 8 years, there has been a sharp rise in the use of stone veneer on residential homes; most of it mixed with other types of exterior finishes such as vinyl siding, stucco (EIFS), and brick veneer. Questioning local masons and tile contractors on how they install adhered masonry, I was surprised to learn that most of them simply placed the stone veneer directly over the house wrap (air barrier) and wall sheathing (OSB or plywood); making no provisions for protecting the untreated framing beneath from water. For some time I have had a concern that this system could be a ticking time bomb. Unfortunately, it wasn't long before that concern became reality.

In October of 2008, I was called to inspect a home that was experiencing a number of problems; the primary concern of the buyer being cupped floors on the first floor and a wet crawl space. Upon close examination of the home (see photo top right of home), at the front wall between the garage and front

porch, I found leaks inside the house on both the top and sides of the window frame, water stains on the sheetrock, soft drywall, swollen and cupping hardwood flooring below the window, and a high moisture content on the inside trim. On the outside of the house, there was no flashing or weep holes over the windows. Also, the stone window sill had been laid flat and; interestingly, I noticed that the stone veneer below the lower roof overhangs was uncharacteristically darker than the stone above the lower roof; an indication that roof runoff from the adjacent roofs was running down the face of the stone veneer and over the top of both lower windows. With no apparent provisions for handling the water, either on the surface or behind the stone, I suspected that the framing behind the stone veneer would have extensive decay and mold. As I mentioned previously, the sheet rock behind the wall was soft so water was definitely getting inside the wall.

Buyer Requests Repairs

Based on my preliminary evaluation of the house, the buyer requested that I develop specifications and details so that bids could be obtained for the repair. Familiar with standard brick veneer construction, where a 1-inch air space is provided between the brick and framing, I had to do a little research to learn how adhered stone is suppose to be



applied directly to framing in order to prevent moisture decay. Like the EIFS system, I expected that a drainage barrier was going to be needed behind the stone. For direction and guidance, the Masonry Advisory Council was contacted and asked if they had either specifications or standard details on adhered stone masonry. They did not but referred me to the Brick Institute of America's detail for adhered brick veneer (shown at bottom right of page 2).



ENGINEERING:

Principles & Practice



Did you know that...

Tyvek (house wrap) is a "wind barrier?" Its purpose is not to protect the framing from moisture but to reduce air leakage. According to the US Department of Energy, up to 40% of the energy consumed to heat or cool a building is lost to air leakage. And, air leakage increases with wind.

Also, some of those who install housewrap don't always take its air barrier function seriously since many neglect to tape the seams.

We've found that a number of trades in our area have been using housewrap as a vapor retarder (such as the case described in this newsletter). Moisture will penetrate house wrapping. The permeability of housewrap varies from a perm of about 58 to as low as 5, depending on the product (the lower the perm rating the less permeable the material).

[Did you know that drywall installed with proper detailing at wall penetrations (i.e. wall outlets, lights, ceiling access, window & doors), provides as good or better an air barrier as properly installed housewrap?]

Suspicious Confirmed. Buyer Requests Repairs...

Once the stone veneer was removed, we found that the stone masonry, with its underlying metal lath and parging, had been applied directly on top of the Tyvek housewrap! See Principles & Practice box on left to see why this was such a bad idea.

They warned me that the BIA details did not go far enough in that they did not address window and door openings. They recommended that I incorporate steel lintels and/or flashing and weep holes above windows and doors.

With this information, I developed a set of specifications and details for the removal of damaged framing and provided detailed information for the "proper" replacement of adhered stone veneer.

Construction Begins

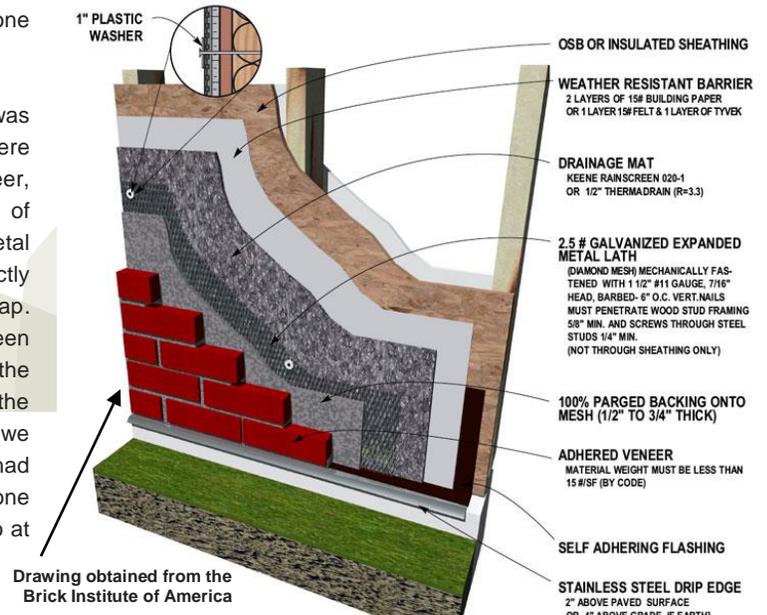
Once the stone veneer was removed, suspicions were confirmed. The stone veneer, with its substrate of cementitious parging and metal lath, had been applied directly over the Tyvek house wrap. The Tyvek, in turn, had been applied to the surface of the OSB wall sheathing. With the wall sheathing exposed, we could now see where water had migrated behind the stone veneer (see staining in photo at bottom right of page 1).

The leaks had decayed a significant portion of the wall sheathing (see photo of interior side of OSB wall sheathing, bottom left of page 1), studs, and adjacent floor joists on the front wall between the garage and porch.

There was also damage to a portion of the adjacent garage wall. The cost for remediating the problem and correctly replacing the stone came to approximately \$20,000.

If you have concerns about stone veneer or any other problem with your home, call our office and ask for Tonya. She will schedule a visit with one of our experienced Engineers. You may also request a copy of our detail & instructions for constructing adhered stone veneer.

BOBBY L. JOYNER, PE



Drawing obtained from the Brick Institute of America



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