Subject: Building Enclosure News
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Conversation: Building Enclosure News

Hi all, Richard here ...

As I know you're interested in Building Envelope issues, I'm sending you my bi-monthly newsletter. I also value your privacy and if you would prefer not to receive this newsletter, please hit reply and change the subject line to "Delete from newsletter list" As always, I'd be glad to discuss your concerns and comments on these issues.

Tip of the Month: Pressure-Equalized Rainscreens Are Not a Panacea
For the past ten years or so, I have given my Build Boston workshop on pressure-equalized rainscreens. The elements of a pressure-equalized rainscreen (PER) are as follows:

1. An outer rainscreen with baffled openings that let in air but are designed to shed water by countering the forces of kinetic energy, gravity, surface tension, and capillarity. The force of wind pressure is resisted by providing an air barrier at the back of the cavity (see below).
2. A cavity that accommodates drainage of any incidental water that gets past the rainscreen. This cavity usually has insulation on the back (inner) wall of the cavity in contact with the the third element, which is
3. The air barrier. The air barrier is also the drainage plane and may also be a vapor retarder.
4. The final element of the rainscreen is vertical and horizontal cavity closers which compartmentalize the rainscreen so that wind forces, especially at corners of the building and at the wall-to –roof, do not cause the huge differential pressures on the air barrier that occur at corners (called “salient corners” in Table 1611.6 of the Building Code).

Ever since I first encountered rainscreens, there have been manufacturers (particularly of composite metal panels) claiming that they provided a pressure-equalized system. However, it has only been recently in the US that there have been commonly accepted methods of achieving an air barrier. So, how could they provide the third PER element? When pressed, these manufacturers would admit that they had no control over the quality of the air barrier. Also, most of these systems did not make a serious attempt to baffle the openings in their systems, the first element of a PER.

The latter problem continues today. In a traditional system, the sealed joints create an outer air barrier at the face of the rainscreen, so that if any water does enter, it will not have the full force of the wind to drive it through imperfections in the inner air barrier, which is also the drainage plane. On the other hand, a rainscreen that lets in significant amounts of water is a likely source of really bad problems, especially if the air barrier is not perfect and watertight, because the full force of wind pressure acts across the inner air barrier/drainage plane. This pressure will drive water through the tiniest of imperfections in the air barrier. In other words, it takes three things to make a leak; water (we can’t stop the rain), a hole (we can’t build things perfectly), and a force (see item 1 above). But we can stop them all from happening together by **baffling the joints** and pressure-equalizing to prevent water from getting to the imperfections in the air barrier/drainage plane.

Performance Testing:
The way I have addressed this problem is to specify that a mockup of the proposed system will be tested and to require that there be no water on the insulation or inner air barrier/drainage plane at the end of the test. In other words, this requires the fabricator to provide the baffling that is often not included in their systems. The air barrier is tested after the fasteners for the insulation and for the girts for the panels have been installed, to be

sure that it meets the air barrier requirements. The whole system is tested for water leakage after the rainscreen panels are installed. On filed sub-bid projects, the air barrier is also tested before any fasteners are put through it to verify that the air barrier subcontractor has met the requirements of the specifications.

National Standard Needed:
The basic problem has been that there has not been a national standard against which all of the manufacturers can test their systems. If such a standard existed, we could compare systems.

News of the Month:
I met yesterday with four major composite panel manufacturers who are part of a consortium working through AAMA on a Task Group to develop such a standard. I was the only non-manufacturer on the committee (except for the testing agency representative) and so it was difficult to get as stringent a standard as I would have liked. However, the standard will be good enough to be useful, with caveats. I am pleased to report that the second draft is complete and they are looking to ballot the final standard in the spring!

More on another subject next month!

I wish you all happy holidays and a successful new year!

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Richard

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