ZbD: Notes from the Field

Insights in High-Performance Construction

IS0015 // October, 2017

The Aspiring Vapor Barrier – Part 1

By: Jon Haehnel

About the typical commercial flat roof, I would like to make a case for the roof vapor barrier to do more, to be an air barrier as well. I know the case against this is a strong one. It comprises two clear arguments: 1-we've done it this way for a long time and, 2-it's much simpler for a vapor barrier to be just a vapor barrier. Both arguments are valid. Thousands of flat roofs exist with just a loose laid vapor barrier and they seem to perform adequately. And I can't refute the fact that making the roof vapor barrier do double duty as an air barrier requires more detailing, sequencing, and coordination at the roof perimeter, at roof curbs, and at penetrations. Still, I persist.

Three significant benefits are bestowed when the roof vapor barrier is also an air barrier.

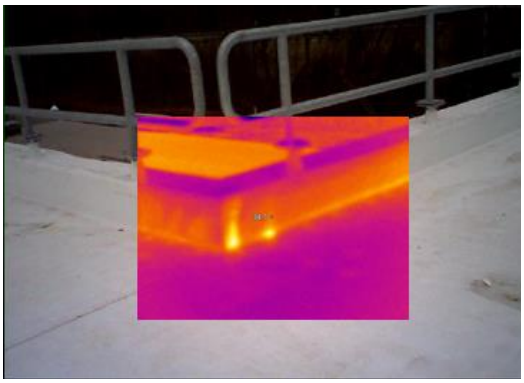
1- Energy efficiency. I know, this is the same old saw from guys like me. But both physics and reality bare out the truth. When the roof air barrier is connected to the wall air barrier there is less inadvertent mixing of indoor and outdoor air. Which means it takes less energy to keep the indoor air temperature and humidity exactly where you want it. Moving on...

2- A roof air barrier keeps conditioned air from getting pushed into the roof layers where it does not belong. Warm air in the wrong place can lead to condensation, saturation of the insulation, rot, and rust. Don't believe me? Take a look at this roof where inside air was allowed to slip past the insulation layer and had free access to the roof sheathing. Serious condensation, serious rot. The roof is only five years old.

You may argue that this wood based flat roof is not the same as traditional flat roof. Okay, I see your point – different materials, different design. Personally, I have not seen a failure like the one above on a typical commercial flat roof but my

Continued on pg. 2

colleagues have. What I have seen is the seeds of a failure like this that we caught during construction.



3- An effective air barrier increases roof uplift resistance. Membrane roofs are subject to uplift and delamination when wind is funneled between adjacent buildings, around roof structures, or around roof edges. The same forces that can lift a 747 into the air can tug and prod at the roof membrane until it bulges and tears off. The principle is this: air forced into a constrained path, i.e. wind through an alley or forced around a corner, creates a negative (or low) pressure zone above the roof membrane.

Above is the roof parapet with an infrared image showing warm air streaking up into the parapet. To the right is looking at the roof from below to see an opening in the metal deck. The arrow is pointing to the roof insulation. In this case, the metal deck is the air and vapor barrier so it cannot have any holes through it.

Air pressure below the membrane is temporarily more positive (or higher) and pushes the membrane up. A roof air barrier reduces this effect because it separates the building's air volume from the air volume inside the roof layers. So, the only pressure to push up on the membrane can come from within the roof layers – a much smaller volume of air and a much weaker push.

If you want to know more about roof uplift I recommend this great article by scanning the quick code to the right.

Have I made the case for making the roof vapor barrier do double duty as a continuous roof air barrier? Drop me an email if you see holes (pun, intended… whatever) in my arguments. Next month I will give examples of how the humble vapor barrier can be made into a mighty air barrier.

You may have noticed several months with no "Notes from the Field". If you didn't notice, lucky you, you've been very busy and you don't need to read further. If you did find yourself on vacation with nothing to read well, that is my fault. We have had a very busy summer here at Zero by Degrees and I just could not keep up with the technical articles. Sorry about that.

Breaking the Ice: Quinn Treadgold

By: Jocelyn Warczak

It's better to be late than never! About a year ago Quinn Treadgold joined our ZbD team. As you may have noticed we were incredibly busy with field work this summer and our monthly newsletters went by the wayside. However, we're back at it now. So, let's get on with it!

Growing up in Voorheesville, NY, Quinn has always loved working with his hands. "I've always liked manual labor. I learn hands-on so my degree was ideal. And the fact that I get to be outside quite a bit for work is even better. So even though my background isn't in building science, I've loved every minute of it." After high school, Quinn moved to Burlington, VT for college, where he studied Mechanical Engineering at the University of Vermont. Also, while he was at UVM, he studied Mathematics and graduated with a minor as well.

"When I was a kid, I spent a great deal of time doing the kinds of things any kid loves – skiing, camping, and kayaking, those kinds of things. I also love running. I've raced a couple half marathons with friends. Like I said, anything outside and I'm there."

We're happy to have Quinn on our team. As we've been expanding our work, the opportunity to bring new members onto our lineup has been exciting.

Our field team: Jon, Peter, Mike, Quinn

Coming Next Month:

- Opinion: Ping Pong Water & The Chemical Engineer
- My Dad and Windmills

Serving Vermont, New Hampshire, Maine, Massachusetts, Connecticut, Rhode Island and New York

Connect with us:
www.zerobydegrees.com
802.522.9713

Each month look for our Quick Code here to access our newsletter on your smartphone.

Do you know someone who might be interested in receiving our newsletter? Email our Office Manager, Jocelyn, to have their address put on our mailing list.
jocelyn.warczak@gmail.com