

## **Open Cell (Icynene) Spray Foam Defects under Roof Deck**

The following area had been scanned using IR, we didn't notice anything.

No deflection either. I started cutting at eye level and cut out a small box.

I felt I can slide it out as there was no adhesion at the back.

I then "followed the trail" going down all the way to the soffit. There appeared to be an almost direct "line" of voids leading down to the soffit:



You can feel air coming in from the soffit in the center but not at the left and right openings (you can see I opened the neighboring soffits, too). You can see above two layers at least were sprayed and the foam

adhered well only at two spots in the middle and at bottom. However there are voids around those areas, too. Rafter adhesion is good everywhere.

A closer look at the top looking towards ridge. Around 1" gap pretty much everywhere.

You can see the foam initially did stick to wood, there is a fine film on the wood. I suspect it then detached during the foam's curing period and sagged; hence, there's "hair" on the exterior side of foam.





Here we are looking up towards ridge, you can see the gap at top right is even bigger, that's right under the ridge. You can also see voids between the two layers.



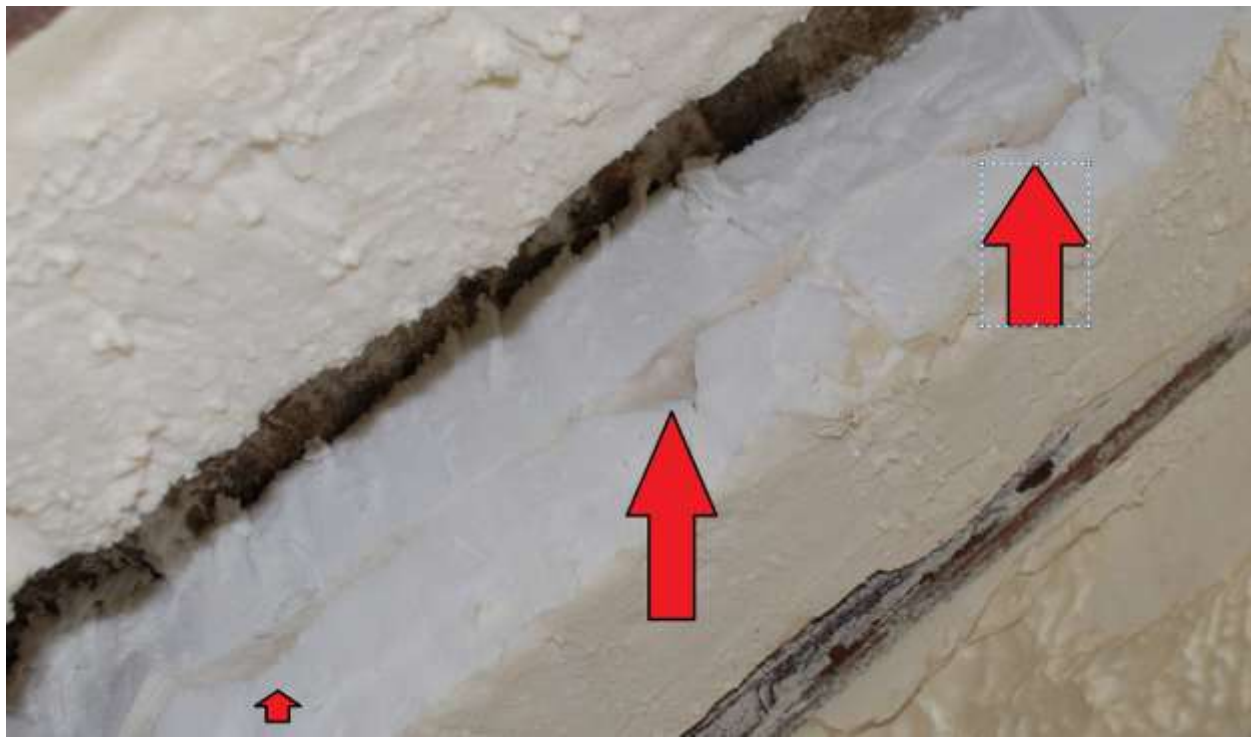
This is a closeup of the above. Gap almost 2 inches. You can see the 'hairs' which remind me of homemade bread rising too quickly when baked too early. You can also see the foam has detached



before fully cured. The area above void is the wood plank:



The next photo was taken without flash to give a better view of the voids because the flash tends to hide them:



Voids between layers over 1”:







A better shot from the left here:





The moisture appeared to be coming from down there, the soffit. After I opened this a few days ago, the RH in the upper floor is fine! I suspect the moist air was coming in behind the foam where it condensed at night. The water and vapors were absorbed by the foam and accumulated over time.



This would also explain the results of my plastic sheet experiment. Plastic was taped airtight over foam in the morning with a thermometer stuck behind the plastic. The RH shot up to 99% within 3-4 hours. The plastic later condensed from the inside (condensation occurred inside the plastic between plastic and foam) 26C = 79F:



The last photo was north facing. This ceiling is facing south:





You can see three layers above and also large voids behind foam.

This is the closeup:



Proof more than 1":





The following are some foam samples, exterior side of foam is at top:



The hair like appearance:





A better view again without flash:



Poor adhesion between layers and large voids in-between:



This one was taken at house's main ridge. We are looking upwards. I opened a random area, no deflection or other clues before opening. I believe we looked up here as well using the IR and didn't see anything suspicious:



A large >1" void right near the ridge. Photographed again without flash for better contrast:



This is what I pulled out of that area:





Above you see again two layers, and it's a foam piece called "Prince" with a "perm" ☺. The top is the exterior side, which should have been flat but instead, at the right it sticks out almost 2". This clearly shows the foam wasn't applied correctly.

Apart from that, the foam used to look beautiful initially but the chemical stench is returning every day as temperature increases. My wife never had migraines but now she has been suffering from headaches for several weeks, ever since we took down the XPS boards and the chemical odors became stronger.