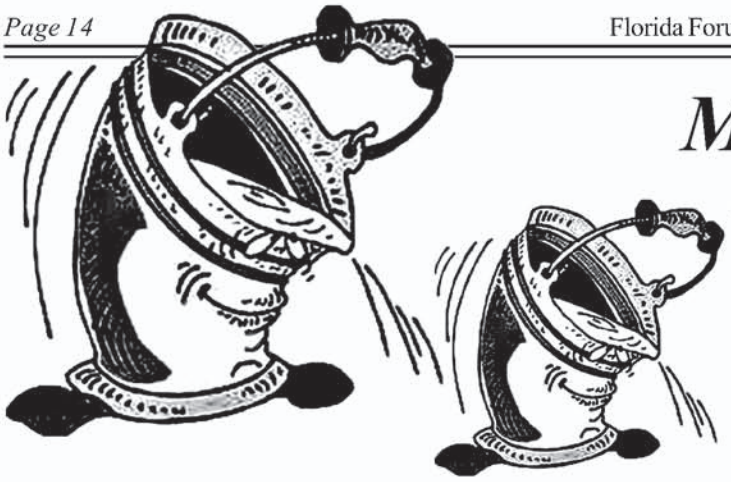

Mystery Roof Leaks

Allen Gezelman, P.E.

Every roofer has probably had a few *Mystery Roof Leaks*. It just does not make sense! You did the job with proper care . . . everything on this job is right out of the NRCA Roofer's Manual. You used the right materials and made sure the job was done right at every step of the way, but still there is a leak. Why is this happening? Doesn't basic physics say that water always flows downhill? Why, in this case, does water seem to be running sideways or maybe even uphill? That is the only thing, which could explain this particular leak! What the hell is going on? Surprise! Mystery Solved! You're right! The water is running sideways or, in some cases, even uphill!

But how can this happen?

Water can run uphill because of negative air pressure across the building envelope. The air pressure outside the building is higher than the air pressure inside the building. This creates a pressure difference sufficient to cause water to flow thru the building envelope – even against gravity. The mechanical designer and/or the mechanical contractor "screwed up" and you are" left holding the bag". Boy! You say, "That sucks!" You are right! It does suck – that is the building is sucking water in thru cracks and small openings in its' outer skin, e.g. "envelope" because of "negative air pressure" created by the operation of HVAC (heating, ventilating & air conditioning) equipment.

How can the problem be solved and stop your phone from ringing every time it rains? By making sure that the building always has a slightly positive air pressure inside the shell of the building envelope. Start by having an expert and/or engineer (such as me) measure the building's inside air pressure with respect to the outside air pressure with all the HVAC equipment running. Then introduce whatever amount of outside air is needed to ensure that the inside air pressure is always slightly greater than the outside air pressure.

The folks who go around saying that "everything is related" are right in this particular case! Many things about a building are inter-related. A building is a system and everything works together – either for you or against you. Unrecognized or hidden interactions can lead to big IEQ/IAQ (indoor environmental quality/indoor air quality) problems. Anybody remember the problems with the "new" Polk County Courthouse in Bartow about 20 years ago? Water migrating thru the building envelope grew mold, which led to that dreaded condition known as "sick building syndrome". Sick building syndrome is generally first recognized when a lot of people start getting headaches and/or develops other, more serious reactions. This can get very expensive - fast!

Lessons to take away from this article

CYA-Start writing into your contracts and warranties. "Not responsible for leaks or collateral claims caused by negative air pressure inside the building relative to air pressure outside the building". Be aware that negative air pressure can be the source of your **"mystery leak"** and be prepared to hire someone like me to check it out for you.

About the Author

Allen Gezelman, P.E. is an active Florida Professional Engineer (P.E.59180) and a graduate of the US Naval Academy. His most memorable military experiences involved building Special Forces base camps in Vietnam. After military retirement, he ran his own construction company in Florida for over two decades. Before he quit contracting, he held more active, certified, contractor licenses than anyone else in Florida: electrical, general, mechanical, plumbing, roofing, swimming pool, solar, and LP gas. He has done a great deal of graduate study and has a strong interest in "Building Science". He can often (but not always) solve problems for which there is no readily apparent solution and is currently available as an engineer and/or as a "private" (inspection) provider.

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