

Insight Foundation Insulation Protection

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Where foundation insulation is on the exterior of foundations and touches the ground, it needs to be protected.

Yes, this should be obvious, but it is often overlooked. One of the most overlooked issues is protecting insulation from bugs and critters – this is not just a “moisture” issue. Insulation works extremely well on the outside of slab and basement and crawl space foundations. We have known this for a very long time. What we have also known for a long time is that we don’t want the insulation to become an insect “interstate” and a home for critters.

I am not going to get into an argument about what insulation system works best. I have enough grief with the carbon parts in my car. For the sake of argument I am going to say that they all work. They don’t all work the same way, but they can be all made to work. Here is my partial list...note the word “partial”...extruded polystyrene, expanded polystyrene, mineral wool, rigid fiberglass, spray polyurethane foam, polyisocyanurate, wood fiber. We done with that? Let’s move on. They all have to be protected. All of them.

Let’s start with the obvious part. Drain the water away from your building perimeter (**Figure 1**). Don’t forget gutters, downspouts, whatever. Don’t make surface water become groundwater beside your building. Send the water to your neighbor’s property...give them the problem....just kidding....Slabs are easy (**Figure 2**).

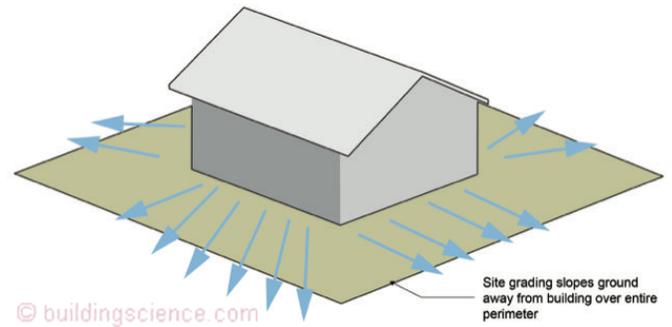


Figure 1: Site Drainage - Drain the water away from you building perimeter.

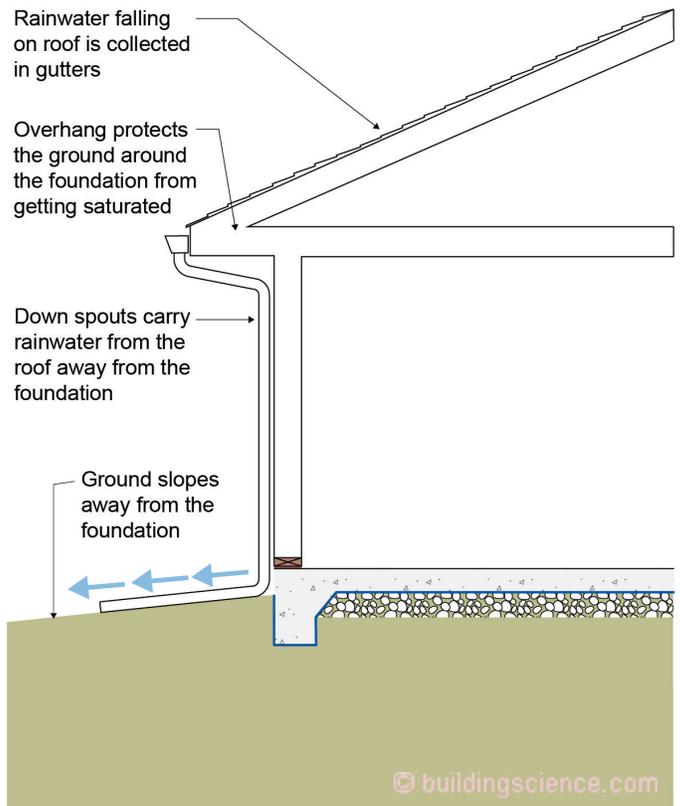


Figure 2: Gutters and Downspouts - Don't make surface water become groundwater beside your building.

Check out **Figure 3**. Note the protection board or panel. Note the flashing set in mastic at the top of the foundation. This is for termites. This is a big deal. Note the perimeter pest protection. This is a big deal. In many, many jurisdictions a removable strip of insulation is required in order to provide the ability to inspect the integrity of the “insect defenses” (**Figure 4**). The strip is often “friction fit”.

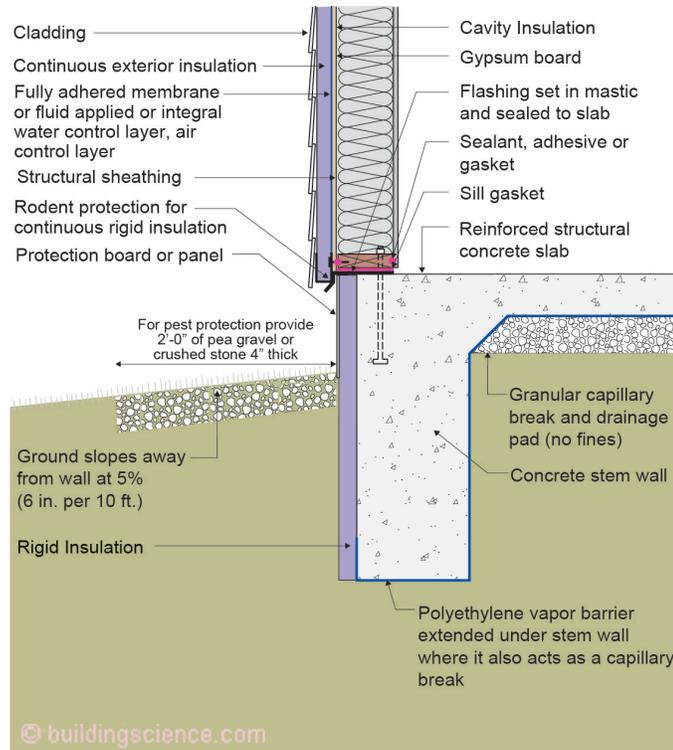


Figure 3: Slabs are Easy - Note the protection board or panel. Note the flashing set in mastic at the top of the foundation. This is for termites. Note the perimeter pest protection.

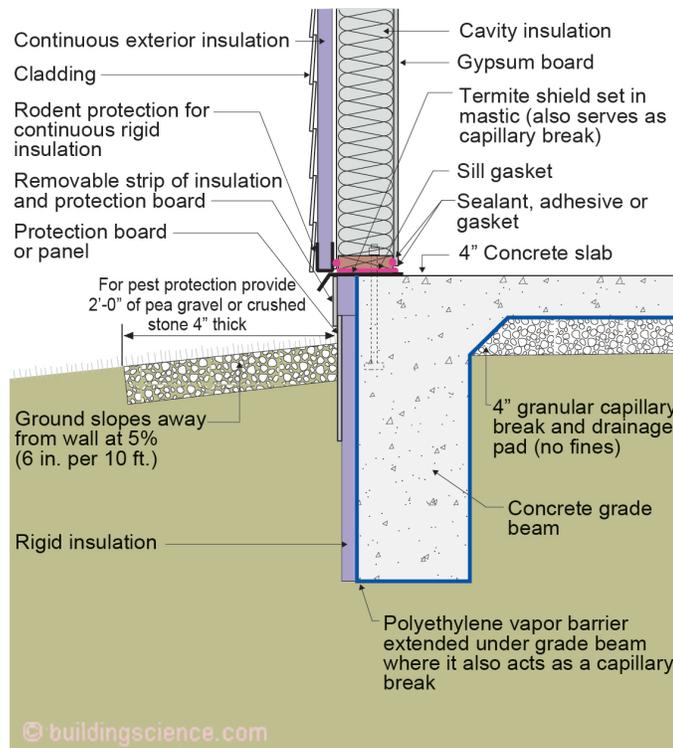


Figure 4: Inspection - In many, many jurisdictions a removable strip of insulation is required in order to provide the ability to inspect the integrity of the “insect defenses”.

Let’s look at basement foundations insulated on the exterior....guess what...same approach as slabs (**Figure 5**). Note the protection board or panel. Note the flashing set in mastic at the top of the foundation. Termites again. This is a big deal. Note the perimeter pest protection. I think I point out that this is a big deal. What about also providing a removable strip of insulation for inspection purposes? Yes, I think it is a good idea, even though it is not often a requirement in areas where basements are common as the probability of exposure to termites is typically significantly lower.

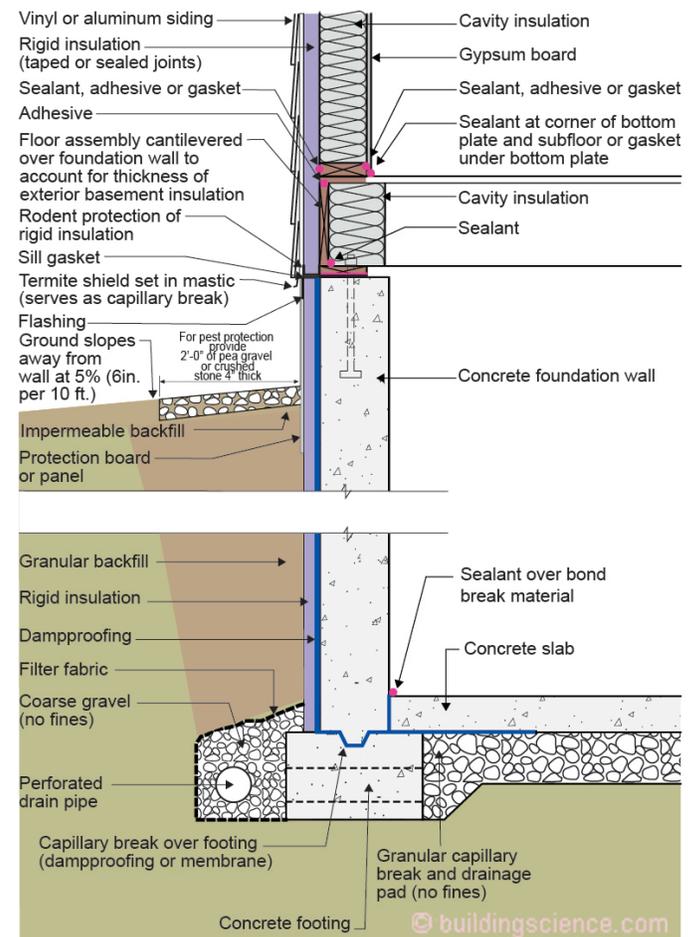


Figure 5: Basement Foundations - Same approach as slabs. Note the protection board or panel. Note the flashing set in mastic at the top of the foundation. Termites again. Note the perimeter pest protection.

What about crawl spaces insulated on the exterior? Treat them just like mini-basements insulated on the exterior. Exactly the same. Get it? What if you insulate them on the interior? Don’t forget an inspection gap (**Figure 6**). This is a requirement in many, many jurisdictions. It is a good idea in general.

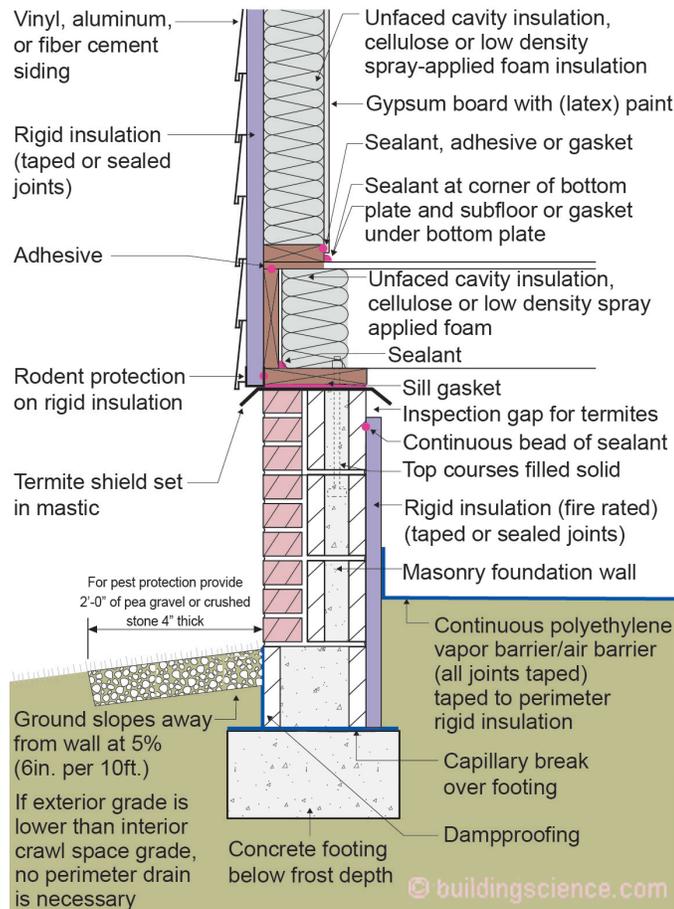


Figure 6: Crawlspace Insulated on the Interior - Don't forget the inspection strip (Figure 6). This is a requirement in many, many jurisdictions. It is a good idea in general.

So what type of protection works? Guess what does not work very well...wait for it...stucco. What? OK, let me tell you a story...a funny story now....but not in 1978 for me anyway. I used to be a builder. I insulated foundations on the outside. I protected them with stucco. Seemed to make sense. Then I got a call. Joe, you are not going to believe this but on the driveway side of our house our kids have busted the stucco because they have been playing hockey with pucks on the driveway and the pucks have poked holes in the stucco. Yup, clearly a Canadian problem...hockey pucks, stucco and foundation insulation.¹

So, can you use stucco? Yes, but you have to “warn” folks that it has limitations. It actually looks very good (Photograph 1). Don't throw baseballs² against it....

¹ I think we exported this problem to the United States to get even for the Wayne Gretzky trade...yes, I have used this line before. Note, when I moved to the US I used the phrase “weed wacker problem” rather than hockey puck problem....even though I had never seen a weed wacker cause a problem....yup, I made things up...

² Needed an “American” citation.
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Photograph 1: Stucco as Protection - It has impact limitations, but it actually looks very good.

Back in the day I used to use a fully adhered membrane “roofing” strip to protect slab edge insulation (Photograph 2). The image brings back memories, it was Dallas, 1995 the first “Building America” Department of Energy demonstration project. I had to sleep at the site playing loud music to keep the copper pipes from being stolen. Apparently, bad music was more threatening than the 2nd Amendment.



Photograph 2: Fully Adhered Membrane - “Roofing” strip used to protect slab edge insulation.

So, what works today? Let me tell you that there is no real “consensus”. Most manufacturers of “fiber-cement” sheets do not recommend “ground contact” with their products....but not all manufacturers of “fiber-cement” sheets. It is a “manufacturer to manufacturer” issue. Most manufacturers of “cement” board sheets do not recommend “ground contact”....but not all manufacturers.

Let me tell you what I did way back when, but would never do again....I used “pressure treated” plywood sheets to

protect exterior rigid foundation insulation. I think the risk is too great. Just, me personally....even though I did it in the early 1980's.

Let me tell you what I did way back when, and would do again....I used aluminum sheet board stock to protect exterior rigid foundation insulation. Did it on my own house...it is 30 years old and still going strong. Check out **Photograph 3** – rigid insulation with a membrane seal prior to installation of the aluminum...the aluminum is installed directly on the rigid insulation...the membrane seal is to handle insects....and **Photograph 4** – the current condition looking almost brand new.



Photograph 3: Aluminum Sheet – Rigid insulation with a membrane seal prior to installation of the aluminum.



Photograph 4: Current Condition - Looking almost brand new.

Check out **Photograph 5** and **Photograph 6** – a house we were involved with in Carbondale, CO in 2006 – where the exterior foundation insulation is protected by rigid metal sheeting installed directly over the insulation. The design credit goes to architect Steve Novy.



Photograph 5: Carbondale, CO - Exterior foundation insulation is protected by rigid metal sheeting.



Photograph 6: More Carbondale, CO - The design credit goes to architect Steve Novy.

What else works well? Cellular PVC. Check out the detail in **Figure 7** – a shallow frost protected foundation that has the rigid horizontal insulation protected by a concrete “skirt” as well as a fully adhered membrane and a strip of aluminum or alternatively a strip of cellular PVC (**Photograph 7, Photograph 8** and **Photograph 9**).

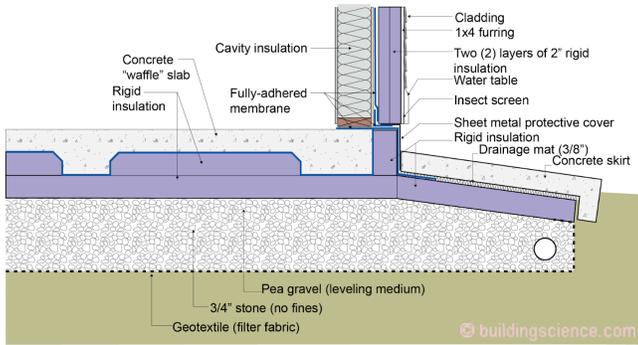


Figure 7: Shallow Frost Protected Foundation - Rigid horizontal insulation protected by a concrete “skirt” as well as a fully adhered membrane and a strip of aluminum or alternatively a strip of cellular PVC



Photograph 7: Shallow Frost Protected Foundation – Rigid horizontal insulation.



Photograph 8: Concrete Skirt – Protecting rigid horizontal insulation



Photograph 9: Cellular PVC - Fully adhered membrane and a strip of aluminum or alternatively a strip of cellular PVC protecting the insulation.

So, where are we after all of these years? Stucco works, just be careful. Fully adhered membrane strips work. Aluminum sheets work. Fiber-cement and cement board sheets work – just follow the manufacturer’s installation instructions. Note that not all manufacturer’s recommend their products for this application. Cellular PVC works. Lots of options. Just remember to absolutely, positively deal with the insect pathways. Did I mention the insect pathways? Insects can be a pest.