

[REDACTED]

June 16, 2011

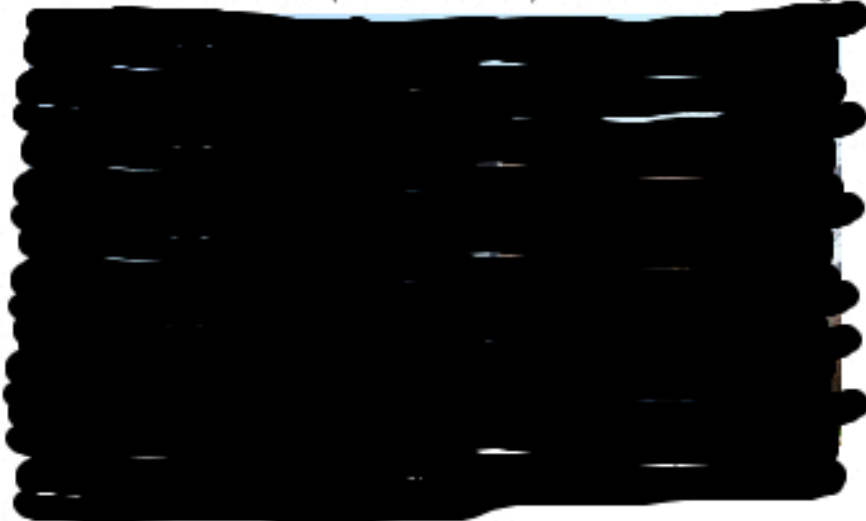
[REDACTED]

RE: Response to the e-mail Forwarded to [REDACTED] Insurance from [REDACTED] on the Dominion Homes Customer Care Response Regarding the Inadequacy of the Stucco Underlayment at the [REDACTED] Residence, [REDACTED].

Dear Mr [REDACTED]

This letter report addresses the e-mail response prepared by Dominion Homes Customer Care, dated June 10, 2011, which was forwarded to [REDACTED] Company by [REDACTED] (homeowner) which was then forwarded to [REDACTED] on June 14, 2011.

By way of background, [REDACTED] originally mobilized to [REDACTED] home on April 14 and April 27, 2011. A visual inspection of readily available visible surfaces was performed to determine the cause and origin of water entry into the south walls of the second floor master bathroom and garage within his home. A report was issued to Nationwide Insurance Company on May 3, 2011 regarding our findings from the inspection. A photograph of the front of the home (west elevation) is shown below in Figure 1:



RESPONSES TO ISSUES RAISED BY DOMINION HOMES CUSTOMER CARE:

Issues raised by Dominion Homes Customer Care are reproduced, and then addressed, in the text that follows. The responses are based on [REDACTED] inspections performed on April 14 and April 27, 2011, our report dated May 3, 2011, and additional information researched from online and from the 1999 Ohio Residential Code For One, Two and Three Family Dwellings.

Issue: We cannot concur with the findings or assertion the underlayment was inadequate, as the author of your report has referenced and cited an inapplicable code...

Our homes are built in accordance with the Ohio Residential Code, which in section 703 under the heading of "exterior covering" does not in fact call for two layers of paper.

Response: The scope of work for this inspection was to determine the cause and origin of the water entry into the interior portions at the south end of the home, particularly the second floor master bathroom.

The 2002 Ohio Building Code, along with recommendations from stucco industry best practices, was referenced in regards to the proper integration of a weather-resistant system for an exterior stucco wall system. The references cited appeared to be in agreement that two layers of a weather-resistant barrier (particularly Grade D building paper) were needed as an underlayment between the exterior stucco and wood sheathing in order to adequately protect the sheathing and interior portions of the home from water/moisture intrusion. Further, destructive testing of the south wall of the master bathroom revealed one layer of an apparent building paper between the exterior OSB sheathing (which contained moderate to heavy water-staining and probable visible mold growth) and the stucco wall assembly. This building paper was water stained, heavily rippled in appearance, and was brittle and easily crumbled when manipulated by hand. The appearance and condition of the paper appeared inadequate to provide a proper barrier against water/moisture from coming into contact with the exterior sheathing (see Figures 2 and 3).



Figures 2 and 3: Master Bathroom – South Wall Destructive Testing – Water-Staining and Probable Visible Mold to Exterior OSB Sheathing (left) and Water-Stained and Degraded Building Paper (right)

According to the email from Dominion Homes, the subject residence was built in accordance with the Ohio Residential Code and was permitted in 2000. Therefore, the 1999 Ohio Residential Code for One, Two, and Three Family Dwellings was reviewed for requirements pertaining to exterior coverings. The pertinent code language is reproduced below:

SECTION 703 EXTERIOR COVERING

703.1 General. All exterior walls shall be covered with approved materials designed and installed to provide a barrier against the weather and insects to enable environmental control of the interior spaces. The exterior coverings contained in this section shall be installed in the specified manner unless otherwise approved.

703.2 Weather-resistant sheathing paper. Asphalt-saturated felt free from holes and breaks and weighing not less than 14 pounds per 100 square feet (0.683 kg/m²) or other approved weather-resistant material shall be applied over studs or sheathing of all exterior walls as required by Table 703.4. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm).

Exception: Such felt or material shall not be required:

1. In detached accessory buildings.
2. Under panel siding with shiplap joints or battens.
3. Under exterior wall finish materials as permitted in Table 703.4.

4. Under stucco lath backed with approved weather-resistant membrane or paper.
5. Over water-repellent sheathing materials.

As outlined in Section 703.1 of the applicable code requirements above regarding exterior coverings, exterior walls are required to be designed and installed in the specified manner given "to provide a barrier against the weather." As mentioned previously and shown in Figures 2 and 3 above, the water-stained and degraded condition of the apparent building paper suggested the building paper was inadequate to properly protect the wall sheathing and interior portions of the home from water/moisture intrusion through the stucco wall assembly.

In Section 703.2 above, although the use of a weather-resistant barrier behind stucco is not specifically mentioned in Table 703.4, it is inferred that it is needed based on exception #4 of the code language which states that it is not required if the lath is already backed with such a weather-resistant material. Further, Section 703.2 requires that the asphalt-saturated felt, or other approved material, be applied horizontally with the upper, overlapping layer lapped over the lower layer "not less than 2 inches". As noted in the original inspection report this is identical to the lap requirement given in stucco industry best practices. As observed during the destructive testing of the exterior OSB sheathing in the south wall of the master bathroom, the horizontal lap in the building paper was measured to be up to 1-1/2". This deviates from the lap requirement in the applicable residential code language above and from stucco industry best practices.

Following the inspections of the home and the removal of evidence, the apparent building paper partially adhered to the exterior side of the removed section of OSB sheathing was compared with #15 ASTM D 4869 Type 1 felt paper which was stored in EES' garage (United Roofing Manufacturing Company, Inc., Eutaw, AL). The comparison/analysis of the two samples was conducted at EES' headquarters on April 28, 2011. As indicated in our report, this included the following observations:

- The #15 felt was much thicker when manually felt by hand.
- The thickness of the #15 felt ranged from 0.0215" to 0.0240" (Figure 4).
- The thickness of the paper on the removed section of OSB ranged from 0.0090" to 0.0110" (Figure 4).
- Both samples were manually torn by hand. The #15 felt appeared to contain numerous large/long fibers, while the paper on the OSB appeared to contain small/short fibers (Figure 4).



Figure 4: Comparison between Stock Type 1 #15 Felt and Apparent Building Paper on Exterior Side of Removed Section of OSB

Based on the comparison performed by [REDACTED] the material on the exterior side of the removed section of OSB was much thinner than the stock #15 ASTM D 4869 Type 1 felt paper. A review of ASTM D 4869, titled "Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing", indicated that the net mass of the saturated felt was 8.0 pounds per 100 square feet (0.390 kg/m^2).

In accordance with the applicable code language in the 1999 Ohio Residential Code for One, Two and Three Family Dwellings reproduced above; "asphalt-saturated felt weighing not less than 14 pounds per 100 square feet (0.6683 kg/m^2)" is required as a weather-resistant paper. In order to meet this requirement, at least two layers of #15 ASTM D 4869 Type 1 felt paper would be needed. Based on the physical comparison between the stock #15 felt paper and the apparent building paper removed from the home, the net mass of the building paper would be much less than that of the #15 felt, therefore more than one layer, or even two layers, would be needed to meet the residential code requirement. Therefore, the lack of adequate design/installation of the weather-resistant paper likely allowed any water/moisture penetrating through the stucco wall assembly to pass through the inadequate building paper and damage the OSB sheathing and limited interior spaces.

[REDACTED]

Setting arguments aside and regardless of the code year cited, it is clear that as installed, the waterproofing for the south wall was not functioning properly. This resulted in extensive water damage to these wall cavities.

We appreciate the opportunity to further clarify the results of our inspection and to answer the above questions and concerns. If you should have any questions or need further information regarding our response to the issues raised by Dominion Homes Customer Care in regards to the [REDACTED] property, please feel free to contact our office at [REDACTED]. Please refer to the [REDACTED] project number [REDACTED].

Best regards,

[REDACTED]
[REDACTED], Project Engineer,
[REDACTED]

[REDACTED]

[REDACTED]