CASE IN POINT

Careless Construction Causes Nightmare

by Paul Cove

A house I examined recently was only 21 years old and worth a half-million dollars, but required over $60,000 of structural repairs. Almost 90 percent of the sheathing had failed. Most of the sill, and some of the wall framing had rotted as well. The damage had multiple causes, but the primary problems were:

- framing too close to the ground
- improper sill details
- inadequate sheathing material

Wood at Grade

Wood members placed too close to the ground become wet from rain backsplash. As shown in Figures 1 and 2, the siding and sill were virtually touching the ground in places. Furthermore, the top of the foundation projected out beyond the house on two sides, trapping water against the sill.

Where there were no gutters, the problem was magnified. Shrubs also increased the problem by slowing down the drying rate of the wood (see Figure 3). In short, wood that is continually moist will rot and invite attack by insects. This house had damage from both, and the damage was worst close to grade.

Unconventional Framing

The bottom plate, believe it or not, was a double 2x4 set so it overhung the foundation in many areas by 2 inches (see Figure 4). The sill was offset like this to compensate for errors in the foundation dimensions. It was also not secured to the foundation. As the sill rolled out, the band joist sagged and cupped, causing settlement and cracking of the interior walls. This area shown in the photo was hidden behind an attached deck, and suffered rot and termite damage in the plates and joist ends.

Unsound Siding

The siding was 3 3/4-inch beveled wood (clapboards) but had a lap joint of only 1/2 inch or less. Although the siding itself was in good condition, behind it was a mess. Rain entered the walls through the undersized lap joints, delaminating the sheathing and contributing to the rotting of the sills and framing. It was not surprising that the sheathing was delaminating, since the builder used 3/8-inch interior-grade plywood for the wall sheathing! Also, rather than a waterproof building paper or membrane, he used lightweight rosin paper.

Damage was not limited to the lower portions of the building. Figure 5 shows the extensive damage caused by rot at the second-floor band joists where they overhang the first floor.

Figure 2. *Damage to the garage sheathing and framing extended from grade to 6 feet up.*

Figure 1. *The siding and sill were within 2 inches of the ground in places, such as this garage wall.*

Figure 3. *The shrubbery looks nice, but slows down the drying at the bottoms of the outside walls.*

Figure 4. *The double 2x4 sill was falling off the foundation due to its cantilevered placement.*

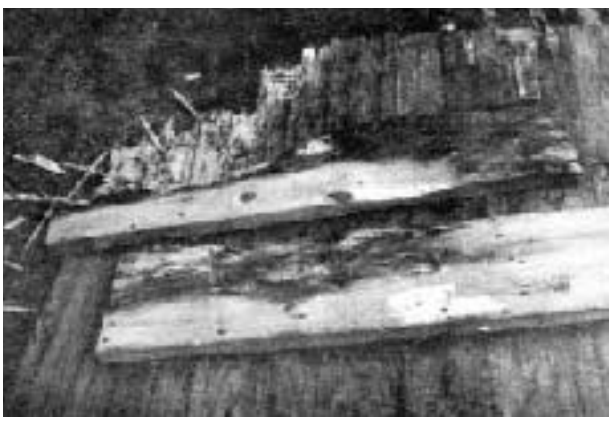

Figure 5. *The second-floor band joists at the overhand suffered substantial rot.*

Leaks, Not Condensation

Figure 6 shows the extent of repairs – nearly all the sheathing was replaced. The areas that suffered the least damage were at the top of the walls where some protection was offered by the small roof overhang. The most severe damage was close to the ground.

The sheathing suffered the worst delamination on the exterior face, indicating that the main source of moisture was the penetration of exterior water, not condensation from interior air. Furthermore, the damage was uniform around the house, in both the heated and the unheated areas. For example, the damage in Figures 1 and 2 are in the walls of an unheated garage, where condensation would not come into play. Damage to the garage framing extended up to 6 feet above grade.

Figure 6. *More than 90 percent of the sheathing had to be replaced due to moisture damage and delamination.*

Conclusion

The problems built into this building were avoidable. The failures were due to negligence and, presumably, ignorance on the part of the builder.

Where water is running down a wall, under it, and is being splashed back from the ground, the damage is predictable. Beveled wood siding, as I discussed in the June 1988 issue (pp. 23-26), should overlap a minimum of one-third its width to prevent water penetration. Also, there should have been flashing or caulking at the corner boards and trim, but there was none. Also, the foundation should have been exposed at least 2 feet above finished grade to prevent backsplash on wood areas.

The effects of water penetration were increased due to the inadequate sheathing. There was not excuse for using interior-rated sheathing as this was stamped clearly on every sheet. The least damage occurred near the roof where a small overhang protected the wall from the elements – a good example of the protection a large roof overhang gives a structure.

Finally, the sill should have been wider, anchored to the foundation, and lined up properly with the foundation. Common sense should have dictated that the building load be on the foundation walls, not on a flat 2x4 in midair. But common sense was the ingredient most lacking on this building project. ■

Paul Cove is a construction consultant based in Dedham, Mass.