CASE STUDY:

Timber Frame Fiasco

by William Lotz

Decay and carpenter ants started the destruction. The lawyers finished it.

The cape-style post-and-beam house was five years old when I first saw it. The builder who had originally built the shell had opened up one wall to build an addition. What he found under the rigid foam insulation on the exterior was severe rot in the pine board sheathing. The pattern of rot closely followed the post-and-beam framing.

The frame was built with 8x8 hemlock timbers, and the spaces between the timbers were filled in with 2x4 framing. The 2x4 infill walls were insulated with R-11 fiberglass and covered with 4-mil poly and drywall on the inside (see illustration). The exterior was sheathed with 1x8 diagonal pine boards, covered by 1 inch Styrofoam rigid insulation. The siding was backprimed pine clapboards.

The interior of the house showed off the beautiful, exposed post-and-beam frame. The homeowner had paid the builder $37,500 to construct the shell of the house in 1982. The owner, who is a lawyer, acted as his own general contractor and hired subs to complete the work. In September 1987, I was hired jointly by the owner and the builder to tell them what had caused the rotted pine sheathing and what to do to solve the problem.

When I visited the house, I observed many signs of unusually high indoor moisture levels, including gray stains on the window frames from excessive condensation. Consistent with this, the house had numerous high moisture sources and limited ventilation.

My recommendations were:

- Vent the clothes dryer outdoors.
- Wire the bathroom exhaust fan to the light switch so occupants would use it.
- Remove the tea kettle (used as a humidifier) from the woodstove.
- Move the stored firewood outdoors.
- Install a kitchen exhaust fan vented outdoors.
- Caulk the checks and joints of the wood timber frame and seal the exposed frame with a urethane or varnish.

As I saw it, the excessive interior moisture was penetrating the wall cavity through and around the exposed timbers, then condensing when it reached the cold sheathing. Note, however, that five of the six recommendations involved the owner reducing the humidity inside the house. That's because without the high moisture, the holes in the vapor barrier would not have lead to decay. The vast majority of homes have unsealed vapor barriers and do not rot. The lawyer/homeowner did not like these recommendations, however, because I did not blame the contractor for the entire problem.

A few days later, the builder called the homeowner to make an appointment to discuss the repairs to the house and the builder was informed that the homeowner had hired an attorney and was filing a suit against the builder.

A year later, the builder's insurance claims agent asked me to again look at the house. By then, most of the clapboards and foam board had been removed, revealing rot on all sides of the house. The damage was much worse than it had been the year before. The decayed wood had attracted carpenter ants that substantially increased the damage. Meanwhile, the homeowner and his family had moved out.

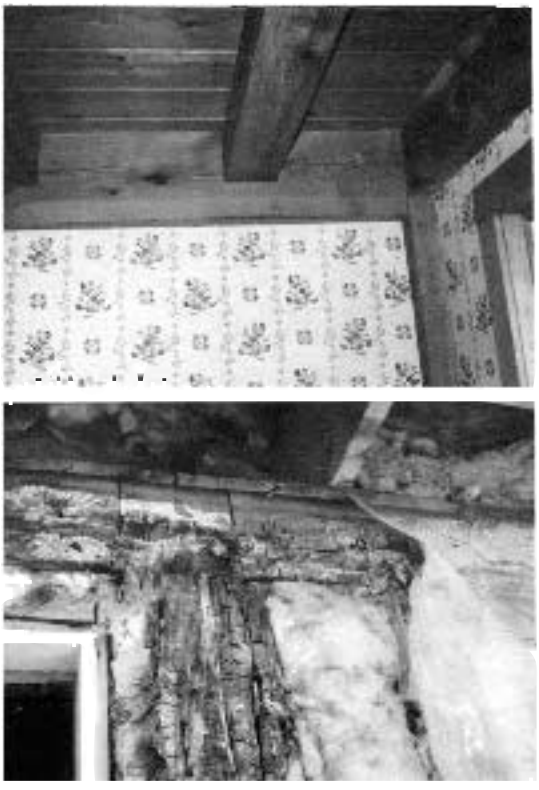
In addition to damaging the pine sheathing adjacent to the timbers, the rot now also reached deep into the 8x8 timbers, leaving in some places only 2½ inches of solid wood. Despite the substantial damage, we felt that the repairs were fairly straightforward and that any experienced timber framer could repair the house for under $30,000.

Unfortunately, the homeowner hired a new builder (with no timber frame experience) to try to fix the building, but this builder had no idea how to do the repairs. Next the homeowner hired a university professor (with no engineering license) to review the structural integrity of the house. As a result of poor advice, the homeowner had the house bulldozed and an entirely new home built on the foundation.

For the next three years, the lawyers ran up big bills. According to court testimony, the homeowner's legal bill grew to $70,000. Also, for these three years, the mortgage payments on the original house were on hold pending the outcome of the lawsuit.

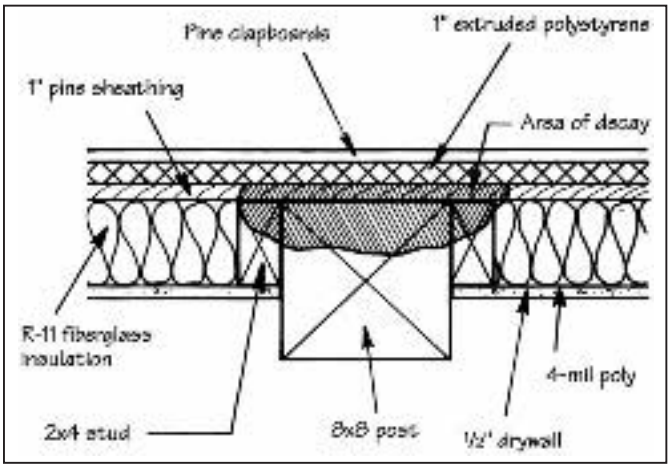
In the meantime, the builder's insurance company tried to deny coverage for the damages, and Dow Chemical Co., manufacturer of the Styrofoam insulation used on the building, was successful in removing itself as a defendant in the lawsuit.

In early 1991, the builder's insurance company offered the homeown-



High moisture penetrated the exposed timbers on the interior (above, left) and condensed under the foam sheathing on the exterior. With the foam removed, decay in the sheathing and timbers became apparent (left). One corner post (above) had only 2½ inches of solid wood remaining.

Once wet and softened from decay, the timbers attracted hordes of carpenter ants. One pile of ant dust measured 3 inches high by 8 inches in diameter.



The decay and insect damage occurred in the sheathing adjacent to the timbers and deep into the timbers themselves.

er $150,000 to settle. The homeowner insisted on $275,000. As a result, the case went before a Superior Court jury in April 1991 for six days of testimony.

I testified to the jury that in my opinion the rot occurred primarily because the clothes dryer was vented into the house, and because the homeowner created generally excessive indoor humidity. I also testified that the 1/16-inch crack between the drywall and post-and-beam frame was not a significant cause of the rot.

In fact, the crack next to the timbers, the checks in the timbers, and the porosity of the timbers themselves all allowed the high indoor humidity to penetrate into the wall cavity. And the foam sheathing on the exterior helped trap the moisture in the wall. But none of the damage would have occurred had the building been maintained at normal levels of humidity.

The homeowner's expert witness, on the other hand, said that the builder's failure to vapor seal the 1/16-inch crack was the cause of the problem. The builder testified that $50,000 would have easily fixed the house.

The homeowner's lawyer asked the jury for $220,000 in damages and $440,000 for "pain and suffering" for a total of $660,000. All of this for a $37,500 house shell!

The jury returned to the courtroom with an award to the homeowner of $50,000 in damages and $500 for "pain and suffering."

It cost the builder approximately $15,000 for lawyers fees, plus a lot of lost time spent in court and in meetings with his lawyers. The homeowner meanwhile got $50,500 towards his sizable debt — a $70,000 lawyer bill plus the foreclosed mortgage on the bulldozed first house.

The emotional toll on both the homeowner's family (psychiatric bills among other things) and the builder (his partnership broke up) was considerable.

There are many lessons to be learned from this episode, including the following:

- If you choose to build homes for lawyers, make sure you have a good contract to limit your liability.
- Whomever you build for, don't build just a shell or other type of incomplete house without informing the homeowner in writing that they must vent the clothes dryer outdoors, vent the bathrooms and kitchen outdoors, and use the exhaust fans and other equipment as designed.
- Seal all joints in the vapor barriers airtight.
- Avoid using rigid foam insulation on the exterior of the wall in cold climates.
- Make certain that your insurance covers construction mistakes. ■

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