Repairing a Termite-Damaged House

Fixing the trail of destruction left by these hungry critters is a team effort

BY ROBERT MIGNOGNA

Every so often, my residential remodeling company, Professional Building & Renovations, in Bowie, Md., gets a call to assess and repair a home damaged by termites. If left unchecked, these pesky insects can cause damage so extensive that entire walls must be replaced to return the home's structural integrity. Any home framed with wood, no matter the foundation or exterior siding, is susceptible. As a result, we have replaced all types of exterior and interior wall systems, from brick to vinyl siding (see "Replacing a Rotted Rim Joist Behind Brick," Dec/16).

Last year, a local family was removing furniture from their parent's house in preparation for listing it for sale with a real estate agent when they found some damage that they suspected had been caused by termites. In September, they contacted us, seeking our services to repair the damage on the two-story, colonial-style home, which had been built in the early 1960s.

HIDDEN DAMAGE

The discovery point of damage was in the home's living room along an exterior wall, where a large wooden bookcase had been located for many years. One of the homeowner's books simply disintegrated in a family member's hands when it was removed from the shelf, along with the shelf and half the bookcase. The discovery was a shock, as there were very few visible signs that a problem existed.

Photos by Robert Mignogna

Most of the termite damage to the framing occurred on the ground floor in the living room **(1)**. Damage was also found around a second-floor window **(2)**, so the author removed the drywall and insulation along the bedroom wall to determine its extent **(3)**. In several structurally significant areas, termites had transformed the wood framing into a papier-mâché-like material **(4, 5)**.

The family initially contacted another contractor, who removed some drywall and insulation from several interior walls to inspect the damage but ultimately declined to take on the repair project. Meanwhile, they hired an exterminator who confirmed their suspicions that termites had caused the damage and subsequently treated the area around the foundation and the now exposed interior and existing exterior walls with a termite bait system consisting of small, treated plastic spikes pounded into the ground.

Assessment. When I arrived on site to assess the situation, the room had been cleaned and emptied of most of its furniture. With the framing exposed, I could see that even the vinyl replacement windows were damaged; the destruction of the existing header and wooden window jambs had resulted in increased weight on the frames. All of this had been hidden from view behind the drywall. To the family's knowledge, damage was confined to framing and structural support members along two exterior living-room walls and near a window in the second-floor bedroom, located directly above the living room.

In a situation like this, we typically will conduct a second, more thorough inspection to determine the extent of damage and to provide a repair cost to the owner. I typically charge a base price for our services that covers our initial time to conduct an investigation and take field measurements. When completed, we provide a detailed line-item cost estimate that includes costs for us to obtain the building permit and other professional fees associated with the repair.

Given the issues that can arise from these types of repairs, we have found that an architect is an indispensable resource to have on a project like this. We work with an excellent one, Stephen O'Neill, of O'Neill Architects, who provides us with the architectural drawings that are eventually submitted to the local building officials for permit review, determines potential building load-path issues, calculates header and rafter size requirements, determines crucial connection points between the framing and foundation, and understands the need to update existing framing to meet current code requirements. Additionally, I have found that it never hurts to have another experienced professional on your team and someone who wants to be involved in the field inspection.

Second field inspection. When we returned to the house to conduct our field inspection, my crew and I removed the remaining drywall from exterior walls both in the living room below and in the bedroom above, exposing a significant amount of damage between the first and second floors. The second-floor rim joist, the double top plates, sill plates, and window headers resembled papier-mâché.

On the exterior, workers carefully removed vinyl siding from the damaged area so it could be reused **(6)**; the mulched planting bed next to the foundation probably contributed to the termite problem. Before tackling the damaged wall framing, the crew supported the second-story floor system, which had sagged almost 3/4 inch **(7)**. To repair the damaged rim joist **(8)**, they fastened a doubled 2-by "ledger" to the second-floor studs as a lifting point for 4x4 posts bearing on hydraulic jacks **(9)**. Once the rim joist had been repaired with new 2-by material, the rest of the wall framing came apart easily, all the way down to the disintegrated plates where the termites had first gained entry **(10)**.

While Steve took field measurements, we spent a couple of hours examining the exposed studs for any additional signs of damage. This included locating mud tunnels that termites use to move from the ground into walls along a slab-on-grade foundation.

In our area, code requires slab-on-grade foundations to be no less than 6 inches above finish grade. On older homes like this, we often find dirt and—even worse—mulch (we call it termite candy) against the siding, thereby putting the grade above the slab and even with, or slightly above, the wall. This provides a path where termites can construct mud tunnels directly into the wall framing, thereby avoiding sunlight. Here, we found that along the damaged walls, grade measured only between 2 and 4 inches below the top of the slab and even closer to the bottom plate due to an offset in the concrete slab. This condition more than likely contributed to the termite infestation.

We estimated that approximately 20 lineal feet of the exterior and interior wall structure would have to be replaced on the first floor, along with two first-floor windows. On the second floor, the damage was less severe and would require replacement of only a jack stud beneath a window header and a few wall studs. We also noted the home was sided with vinyl siding over 1-inch-thick foam board that was installed over the original 18-by-24-inch siding panels. From experience, we knew these panels—which accounted for between 7/8 inch to 1 inch of the exterior wall assembly thickness—contained asbestos particles and would have to be removed and disposed of by a certified asbestos abatement company, and could not be reinstalled.

PLANNING AND REVIEW

Guided by our field inspection and our discussions about structural issues, Steve prepared his preliminary set of drawings and had them ready for review in a few days. To keep the budget in check, we decided to reuse the vinyl siding and vinyl shutters, but we would have to install new windows.

To match the appearance of the other windows on the house, we needed to build frames around the new ones and wrap them with aluminum coil stock, though this is not our preferred trim method. Our goal was to make the repair work indistinguishable from the original, but with supply shortages and lengthy window lead times from our vendors, placing an order for an exact replacement would have resulted in a long wait. Instead, we found stock replacement windows from Home Depot that were similar in size and quality to the other windows on the house, which would allow us to keep the job on track.

Before reframing the walls, workers installed a copper termite barrier over the edge of the slab foundation **(11)**, then used wedge anchor bolts to fasten new pressure-treated plates to the slab **(12)**. Once the walls had been reframed and fitted with the proper hardware to reinforce the connection to the existing framing and foundation, the post jacks were slowly removed **(13)**.

After completing the preliminary work and doing the material take-offs and the cost estimate, including subcontractor pricing for asbestos removal, electrical and plumbing work, and architectural and engineering services, I submitted a final proposal to the family for approval. Early fall in our area can be very wet, so we had to rearrange our work schedule to do the exterior work first. Upon receiving the OK to proceed from the family, Steve "fast tracked" the permit application, and we were ready to begin the following week.

STRUCTURAL SUPPORT AND DEMO

To determine if the damaged sections of the exterior walls caused any deflection in the second-floor structure, we established a laser control line at the top of the double wall plate and extended it from the front of the living room to the farthest corner of the rear wall. This line—which revealed a deflection of the floor joists that ranged between 5/8 inch and 1 inch from the undamaged wall assembly to the damaged sections of wall—would be referenced throughout the remainder of the project for all elevation measurements involving windows, trim, and other fixed objects.

Next, we installed three rows of screw jacks topped horizontally with 4x4 posts long enough to span eight floor joists. The entire area supported was about 140 square feet. Then we applied even pressure to each post, counting the revolutions on each until we removed the deflection over the damaged walls to obtain a positive rise of 1/4 inch. This would give us room to complete the repairs and transfer the weight onto the newly repaired walls. The top of our new wall would be framed to the established laser control line.

Next, we removed the vinyl siding and numbered it for reinstallation, followed by the 1-inch exterior foam insulation board, thereby exposing the original siding panels. That was as far as we could go; we marked only the panels that needed to be removed and called in the asbestos abatement company.

After the abatement crew finished its work and gave us an all clear, we set up hydraulic jacks on the ground with 4x4 posts to take weight off the rim joist located on top of the damaged wall. This was done because that small—yet important—section of wall ran parallel with the floor joists above and was supported only by the damaged rim joist and walls below. To provide a lifting point for the posts, we attached double 2x4s to the exposed studs in the second-floor exterior wall, forming a ledge on the outside of the wall.

We needed to take only enough weight off the wall to get the new rim joist in place. However, before the damaged rim joist could be cut and removed in sections, we sistered a new 2x8 with polyurethane glue and #10 Spax structural screws to the inside section of rim joist, making sure to extend the new board at least 4 feet beyond where we planned to make the splice cut, as we did not need to replace the entire length of rim joist on that wall.

After that, we moved outside and cut out the damaged rim joist. This procedure worked well and provided additional support for the second-floor assembly.

Demo and removal of the studs and wall assembly, as one might imagine, was rather easy; the materials weighed half their normal weight, and the compromised wood severely reduced the holding power of the nails used in the wall construction. The header and window framing along with the sill plate on the back wall sustained the brunt of the damage and could literally be removed by hand.

WALL FRAMING

We began our framing work by adding a length of termite barrier to the formed edge of the concrete slab, per Steve's specifications and local code. We used a product called YorkShield 106 TS, which is a single sheet of 2-ounce copper laminated to a polymer layer with a rubber adhesive, which separates the copper from the preservatives in treated lumber. This was followed by foam sill-plate gasket and a pressure-treated sill plate, which we attached to the slab with concrete wedge anchors every 6 feet. Then we nailed a second plate over the bottom plate.

Next, we installed the double 2-by plate at the top of the wall,

being sure to line it up with our laser control line. We built the walls in place and cut each stud to fit the opening every 16 inches on-center. Steve called for the installation of Simpson Strong-Tie DTB-TZ tie-back anchors at various locations in the corners and where existing walls met the new wall. These were installed with longer wedge anchor bolts through the sill plate into the concrete slab and secured to the studs with special fasteners. This connection detail was designed to protect against uplift and securely anchored the existing and new walls to the concrete slab.

After the walls were in place, we removed the post jacks, once again slowly transferring the weight onto the walls. A quick check revealed that all the wall plates were now aligned with the laser control line.

FINISHING UP

For repairs like this, we like to use Zip System sheathing, because we can quickly install the panels and tape the seams without having to install housewrap. After installing the windows and sealing them to the sheathing with Vycor flashing tape, we ripped some 2-by material to size to picture-frame the windows, then wrapped the trim with white aluminum coil stock, completing the installation with drip caps above the frames. Once installed and trimmed, the new windows were indistinguishable from the others on the house.

To account for the thickness of the removed 18x24 lap panel asbestos siding (which, as mentioned earlier, could not be reinstalled), we installed 2-inch-thick Owens Corning foam insulation board over the Zip sheathing with aluminum fasteners. This matched up perfectly with the existing foam insulation that was used when the home was sided with vinyl. We cut and installed new J-channel around the new windows and reinstalled the existing siding, using control lines to ensure that the nailing flange on the last row of siding lined up with the bottom of the top row of siding above our repair area.

On the interior, we thoroughly cleaned the stud bays on the first and second floors and sprayed them with a coat of primer/sealer. Then we used nonexpanding spray foam insulation to air-seal all the bays (to include the new walls), joints, behind receptacles, and around windows before scheduling our first inspection. After receiving the OK from the inspector for the framing and air-sealing, we insulated the walls with R-15 fiberglass insulation batts, along with the rim joist above the walls in the living room.

Once we received our close-in approval from the inspector, we hung and finished the drywall, applied a coat of primer, and installed the baseboard and window trim. We then applied finish coats of paint and laid down new carpeting in the living room and bedroom. Six weeks after beginning work, we completed our final inspection.

Robert Mignogna owns Professional Building and Renovations, in Bowie, Md. He can be reached at robert@probuildandren.com.

After sheathing the walls **(14)** and installing the new windows **(15)**, the crew wrapped the new window trim with coil stock to match the existing windows and reinstalled rigid foam insulation and vinyl siding **(16)**. The repaired wall looks like it had never been damaged **(17)**.