Earthquake-Damaged Chimneys

Q. *Can a chimney damaged by an earthquake be repaired or do you have to build a new one? What permits and inspections do codes in southern California now require?*

A. *Bill Baldwin responds:* Older brick chimneys in earthquake country usually suffer from inadequate foundations and little or no steel reinforcement. Often, they are not connected structurally to the building. During earthquakes, these chimneys may collapse or, more commonly, break at the roof line. (In Los Angeles, where my company operates, more than 150 chimneys snapped at the roof line and rotated toward the east during a magnitude 5.5 quake.) Even if the chimney appears undamaged, ground movement may have opened up cracks that can lead to a fire in the surrounding framing.

Codes in southern California vary from city to city, with many building departments still allowing an engineered extension to a damaged chimney. These repairs typically involve removing the damaged portion of the chimney down to the roof line, and building a reinforced extension that is both strapped and braced to the roof. City building departments that allow these repairs will usually have a structural detail available "over the counter" to indicate what they require.

An increasing number of cities (Los Angeles and Whittier among them) no longer allow structural extensions to unreinforced chimneys. They maintain that any damaged and unreinforced chimney is inherently too unstable to retrofit. There is even speculation that these extensions could be more of a live safety hazard if they fail and fall as one large segment instead of as the rubble that falls from unreinforced masonry. These cities require damaged chimneys to be rebuilt and engineered "from the ground up."

Although most areas still allow for new masonry fireplaces and chimneys (with design and engineering), zero-clearance fireplaces and metal flues seem to be the future for highly active seismic zones. These units can be boxed and faced with brick, stone, stucco, or other siding, and are the easiest and least expensive way to ensure the best possible seismic safety. Existing interior masonry fireplaces may also be retrofitted with metal flues at the firebox once the damaged masonry has been removed.

It is our opinion that every chimney that has undergone a major shake should be inspected. Even if there is no visual evidence of damage, a chimney sweep should evaluate the firebox and flue. If there is structural damage, we recommend a pre-inspection with your local building inspector to discuss the individual specifics of your chimney. It has been our experience that building inspectors have been more helpful in reaching a creative solution when they have their eyes on the job, rather than just discussing the problem over the phone or at their office.

Bill Baldwin is a partner in Hartman-Baldwin Design/Build in Claremont, Calif.

Removing Vinyl Siding

Q. *Can you explain the best way to unlock vinyl siding panels? We often run into vinyl when building an addition or cutting a new window opening, and would like to know how to remove and replace panels without destroying half a wall's worth.*

A. *Mark Katuzney responds:* Whenever I am called to a job to remove and replace vinyl siding, I follow these general steps:

I begin by looking over the job and

figuring out which panels need to be removed. Rule of thumb: Always remove one course more than needed.

Starting from the weakest or loosest end of the panels I need to remove, I separate one course from the rest of the siding. While you can do this with the claw of a hammer, I recommend the "zip tool" (available from any vinyl siding supplier), which looks like a butter knife with a hook on one end. With this tool, you pry gently at the end of a panel, hook the lock, and pull down. The panel will come "unzipped" as you slide the hook along the lock.

To replace siding panels after the work is all done, follow these guidelines:

Pay attention to the original butt lines and spacing. Lay up your panels and nail them in place. Make sure you don't overnail. The siding should be able to move under the head of the nail, so it can expand and contract with changes in temperature. If you pinch the panel tight, preventing it from moving, it will buckle.

Once you've installed the last course, close the seam by pulling down on the lock above with the zip tool in one hand, while gently pushing against the lock with your other hand.

Mark J. Katuzney is owner of Mar-Kay Siding and Roofing Co. in Yalesville, Conn.

Vapor Barriers Revisited

Q. *Our drywall contractor argues that installing a poly vapor barrier behind the drywall will trap moisture, where it will condense, causing the drywall to degrade. Is there any truth to this claim?*

A. *Clayton DeKorne responds:* The poly isn't the problem. Moisture in wall cavities is only a problem if it condenses into liquid water. To condense on the poly, the humidity would have to be very high (over 50% relative humidity), and the poly very cold (due to poor insulation or lots of cold outside air leaking into the wall). In this case, you'll have condensation problems, with or without poly.

To understand this, let's look at a few principles. Vapor retarders, such as poly, are installed on the warm side of walls to prevent moisture *diffusion* into the wall cavity where it can condense and cause moisture damage. Diffusion is the movement of moisture through the tiny pores in a material and is only a problem in homes with high indoor moisture levels. For example, if a homeowner dries laundry or stores firewood in the basement, boils lots of pasta water, has many pets and houseplants, or a large family that takes frequent showers, the indoor humidity will be high, especially in a small house. The best way to prevent moisture problems under these conditions is to remove the source — install a vented clothes dryer, build a wood shed, and install good bath fans and a range hood. A vapor retarder, such as poly, is a second line of defense to keep moisture from seeping into the wall cavity and condensing.

In the vast majority of cases, however, moisture problems in homes are caused by *air leakage*, rather than diffusion. Warm, moist indoor air that leaks into a wall or ceiling cavity can condense in cold weather when it reaches a cold surface — typically the backside of the exterior sheathing. Or, cold air leaking into a house can cool interior surfaces, causing moist interior air to condense on the inside surfaces — often leading to mildew growth. Wet areas, such as bathrooms, corners in unheated closets, and wall or ceiling areas near band joists, soffits, windows, and doors are among the most vulnerable areas. To prevent these problems, concentrate your efforts on installing adequate wall insulation, good ventilation in wet areas, and air sealing at the gaps around windows, doors, outlets, and the band joist. One way to do this, of course, is to install poly under the drywall, carefully caulking or taping the edges around penetrations. In this case the poly serves as *both* an air barrier and a vapor barrier. ■

Clayton DeKorne is senior editor of the Journal of Light Construction.

Got a question about a building or renovation project? Send it to On the House, JLC, RR 2, Box 146, Richmond, VT 05477.