Q I'm working on a remodeling project where the clients want to replace a modern-style fireplace mantel with a salvaged decorative one. However, the wood surround appears to be too close to the existing firebox opening at the sides and top. How close can a mantel surround be? Are the clearances different with manufactured fireplace inserts (in case their hearts are set on installing the decorative mantel)?

A *Doug Horgan, a vice president of best practices at BOWA, a design/build remodeling company in Northern Virginia, responds*: In my experience, there are two standards to follow with regards to fireplace mantel and surround clearances: With traditional masonry fireplaces, follow the code book standards, and with manufactured fireplaces, follow the installation instructions.

Traditional masonry fireplaces. For standard masonry fireplaces, fireplace codes are in Chapter 10 of the International Residential Code (or local versions, such as the Virginia Residential Code, that are based on it). Section 1001.11 "Fireplace Clearance" of the IRC (2018 edition), Exception 4 states the following:

"Exposed combustible mantels or trim is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such combustible materials are not placed within 6 inches (152mm) of a fireplace opening. Combustible material within 12 inches (306mm) of the fireplace opening shall not project more than 1/8 inch (3mm) for each 1-inch (25mm) distance from such an opening."

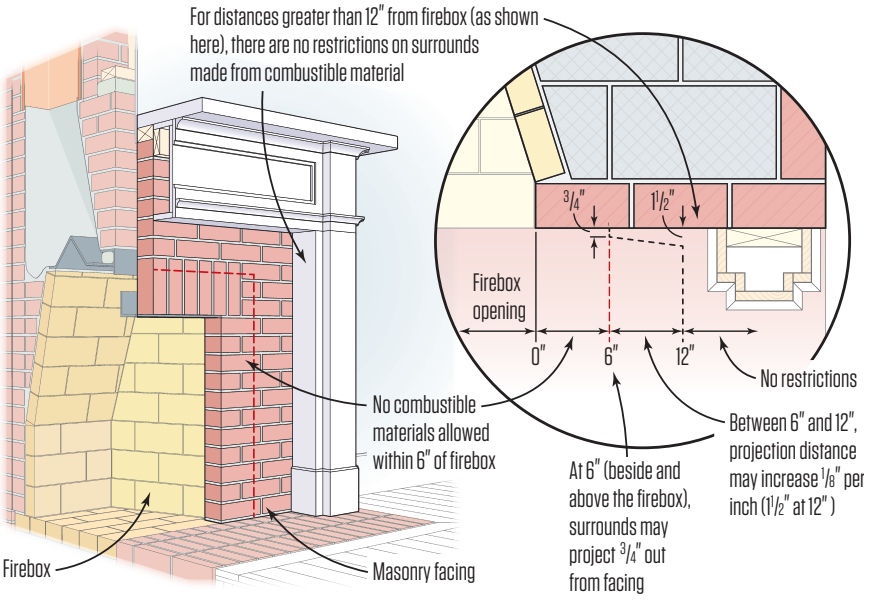
I think of these clearances as three areas: From the firebox opening to 6 inches out, no combustibles are allowed; from 6 to 12 inches away, you can put thin wood (at 6 inches, only 3/4-inch-thick stock is allowed, gradually getting thicker to 1 1/2 inches at 12 inches away from the opening). Beyond 12 inches, combustibles of any depth are allowed. Clearances are the same at the top and the sides (see illustration, below).

Some mantels have legs that project out 2 inches or more from the wall. To meet code, those legs have to be at least 12 inches away from the firebox opening. On the fireplace shown in the photo below, only 8 inches of brick is showing on the sides and top, however, while the wood trim of the contemporary-style surround is about 4 inches thick. To meet code, the surround's thickness would have

Photo: Doug Horgan; illustration: Tim Healey

The modern-style mantel shown above does not meet code because the side trim projects roughly 4 inches out from the masonry facing within 8 inches of the firebox opening. No combustibles are allowed within 6 inches of the firebox (see illustration, right).

Fireplace Mantel Clearances



to be 1 inch deep or less at 8 inches from the firebox (because we gain 1/8 inch per inch as we move from 6 to 12 inches from the firebox).

Manufactured fireplaces. With regards to manufactured fireplaces, mantels for metal fireplaces are installed per the fireplace directions (technically, the safety agency listing, which in practice is the same as the instructions). The mantel clearances are often more generous than the code, but not always. Recently, I was reviewing a product that allowed combustibles at a 50-degree angle past 6 inches. So traditional-looking projecting legs would probably work. But, this same fireplace said nothing projecting past 12 inches was allowed above the firebox, so that could trip us up.

There is simply no substitute for finding the directions and following them. It's also worth checking if there are any unusual hearth requirements. I have seen some manufactured fireplaces recently that required fire-resistant materials, like four layers of cement board, under any tile or stone hearth. We would have to frame the floor system differently if we wanted the stone flush with the wood floor.

Another scenario we're often presented with is having to finish around older manufactured fireplaces. Before installing lots of expensive trim around an old unit, it's a good idea to have a professional evaluate its condition. Many fireplaces from more than 20 years ago are considered hazardous by today's standards or have rusted out and so become hazardous. With older fireplace units, it's possible to find the model number and search the internet for the installation instructions or contact the manufacturer. A fireplace professional may be able to help find the model number.

Q Can helical piles be installed at an angle to reinforce a retaining wall?

Chad Smith, a builder who owns Distinctive Contracting Services in Arnold, Md., responds: My company has used helical piles for a number of applications besides house and deck foundations, including for retaining-wall tie-backs and to provide lateral stability for projects such as walkways and commercial signage. PierTech and Ideal (the brands we typically install), Techno Metal Post, and Goliath-Tech all publish design values our engineers can use in their designs; these values include allowable compression, tension, and lateral capacity.

On a recent project, for example, we used what are called "batter piles" installed at an angle and in line with the framing for a pedestrian walkway for a museum. While that design would perhaps be overkill for a residential project, the ipe walkway winds through a floodplain and is subject to commercial code. Requirements include higher design loads, and the engineer was concerned about the active loads from people walking on the pathway causing the framing to move back and forth. The batter piles help prevent that movement over the walkway's straight runs, some of which measure as much as 70 feet in length **(1)**.

When we use batter piles in a tie-back application such as for a retaining wall, a few different techniques can be used. The design is based upon the application. If a batter pile needs to be serviceable (for tensioning, for example), we can install a sleeve for a threaded rod to pass through the wall, and reinforce the concrete

In this photo showing the framing for a commercial elevated walkway, one of the vertical helical piles is reinforced by a batter pile installed at an angle to limit lateral movement caused by foot traffic on the walkway. A threaded rod bolted to a plate that's welded to the vertical pile connects the two piles **(1)**.

Photos: Chad Smith

with a rebar grid around the tension location. If the application is fixed, we typically either use a "new construction" pile T cap on the end of the pile, or install a threaded rod and embed a large steel plate or steel washer within the concrete wall, or create a rebar grid around the pile top. In less substantial load applications, a simple hole can be drilled through the end of the pile and one or two pieces of rebar can be inserted through the pile and tied to a rebar grid. The approach we use depends on the height of the retaining wall and the engineered design (required for all retaining walls higher than 4 feet).

Another example of an alternative use for helical piles is a sign pylon foundation we recently built. For this foundation, we installed opposing pairs of batter piles at a 7.5-degree angle from the vertical to anchor the sign's steel framework **(2)**. That orientation—rather than a completely vertical one—will provide better resistance to uplift once the piles are encased in a concrete base, which in this project will measure about 15 feet long, 7 feet wide, and 36 to 42 inches deep. The overall size of the mass of concrete not only offers ballast weight to the assembly but also helps increase the side-load shear factor.

To build a foundation strong enough to resist the lateral and uplift forces created by wind blowing against a large commercial sign, the author installed pairs of batter piles, which will later be encased in a massive concrete slab **(2)**. After the slab is poured, the temporary plywood walls holding back the soil will be removed, and backfill will then be compressed around the slab to meet compaction requirements.