Guards

By **BRUCE BARKER, ACI**

ONCE AGAIN, The Word invites you to travel into the dark realm of subjects that are sometimes misunderstood by home inspectors. The Word hopes you will find this trip informative and maybe a little entertaining.

The Word's subject this month is **guards**. The Word finds this subject interesting because these are among the most important safety components we inspect and because practices have changed over time so it's sometimes difficult to know when to call guard deficiencies.

Remember when reading all The Word columns that we're discussing general principles. Something you see in the field isn't always wrong just because it doesn't comply with a general principle. Local building codes, manufacturer's instructions and engineered designs trump general principles.

What is a guard?

A common term for guard is guardrail. Guardrail does a good job of describing traditional rail and balusters, but a guard can be any structure. A guard can be a full or a partial height wall. It can be a wall containing glazing (safety, of course). It can be constructed using metal, wire, plastic composites or just about anything else you can think of. That's why the term guard is preferred over guardrail.

Guards come in two flavors: guards that protect horizontal surfaces and guards on the open sides of stairs. The requirements are slightly different for each.

Where required

A guard is required on the open side of a walking surface that is more than 30 inches above a floor or above grade. Stairs, balconies, decks, and raised porches are the obvious places where a guard might be required, but don't forget less obvious places. Retaining walls and other man-made structures that create a drop of more than 30 inches may also need a guard. Even if a guard isn't required by local custom, you may wish to suggest guards as a safety upgrade in situations where a walking surface is adjacent to a vertical drop-off.

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Many of us measure straight down from the raised surface to determine if a guard is appropriate. There are some unusual situations when measuring straight down may not comply with a recent change in accepted construction standards. A guard is now required if there is more than a 30-inch drop within 36 inches horizontally from the raised surface. It is possible, therefore, that a raised surface is less than 30 inches above the area directly below and yet a guard is still required. Grades sloping away from the raised surface and steps down into another living area are typical examples of this situation. Figure 1 demonstrates this situation.

A continuous guard is usually required along the open side of all stairways. The exception is when a flight of stairs has three or fewer risers. This exception applies even when the flight of stairs is part of a longer stairway. Figure 2 shows how this might occur. Note that this situation usually occurs when the small flight of stairs is used to change the stairway's direction.

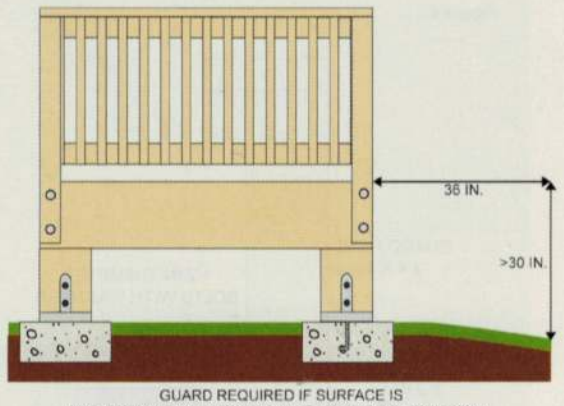
Guard height

The minimum height for guards protecting horizontal surfaces in homes is 36 inches above the finished floor, above surrounding grade and above benches and similar fixed-in-place seating. This last one is easy to miss. If, for example, a deck has a built-in bench around the perimeter, you would measure the guard height from the bench seat, not from the deck floor. This helps prevent a fall if someone stands on the bench. You should check guard height at multiple places along the guard, particularly if the floor is sloped. For example, a balcony guard height may be OK at the front edge, but because the balcony floor is sloped to drain, the height where it connects to the house may be less than 36 inches.

The minimum guard height protecting horizontal surfaces in occupancies other than single-family residential is 42 inches. Some states, like California, require all guards to be 42 inches. The difference between single-family residential and other occupancies sometimes causes confusion. There is no maximum height for guards.

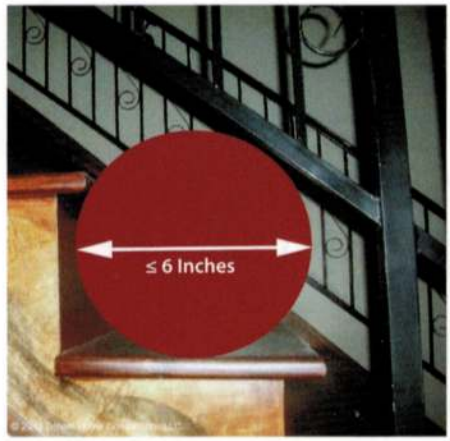
Openings in guards protecting horizontal surfaces should be spaced so that a 4-inch-diameter sphere will not pass between them. This is not the same as having the openings spaced 4 inches or less. Openings may have more than a 4-inch-space between them at

Figure 1



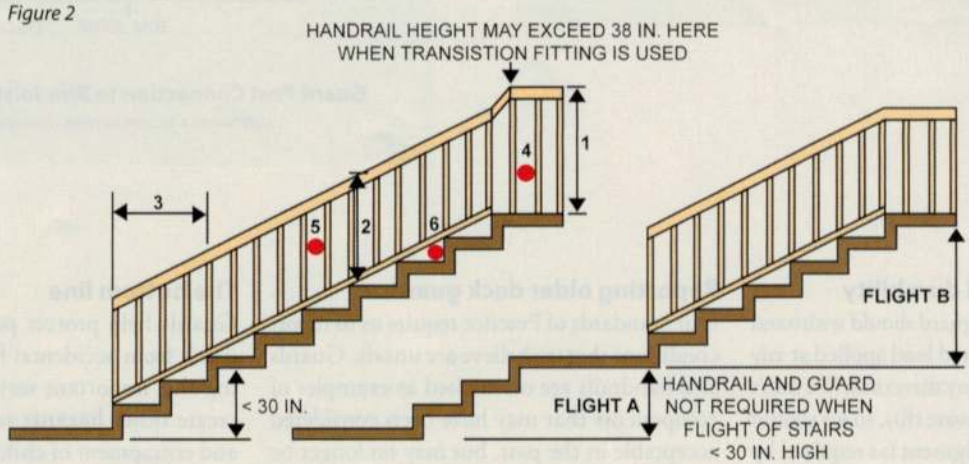
Guard Requirement at Raised Surface

Photo 1



The gap between the guard bottom rail, the risers and the treads should not be large enough to pass a 6 inch diameter sphere.

Figure 2



1 GUARD HEIGHT ≥ 36 IN.
2 STAIR GUARD HEIGHT ≥ 34 IN. AND ≤ 38 IN. MEASURED TO LINE CONNECTING TREADS
3 STAIR GUARD MUST CONTINUE FOR STAIRS < 30 IN. ABOVE FLOOR BECAUSE STAIRS ARE ONE FLIGHT WITH NO LANDING
4 GUARD OPENING MUST NOT PASS 4 IN. DIAMETER SPHERE
5 STAIR GUARD OPENING MUST NOT PASS 4 3/8 IN. DIAMETER SPHERE
6 INTERSECTION OF BOTTOM RAIL, RISER, AND TREAD MUST NOT PASS 6 IN. DIAMETER SPHERE

Stair Guards

some points so long as the space decreases to the point where the 4-inch-diameter sphere will not pass. Remember to check any space under the guard. That space should not allow a 4-inch-diameter sphere to pass either.

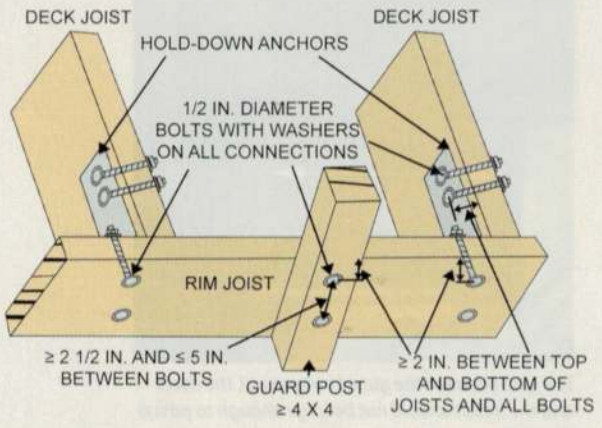
The minimum height for guards protecting the open sides of stairs is 34 inches. The maximum guard height is 38 inches when the guard also serves as a handrail. There is no maximum guard height when a separate handrail is provided. Measure the guard height vertically from the tread leading edge. Don't measure at any place other than the tread leading edge because it may provide an inaccurate measurement.

Openings in guards protecting stairs should not allow a 4 ⅜-inch-diameter sphere to pass through. Wider spacing is allowed at some points so long as the net opening size will not pass the 4 ⅜-diameter sphere.

When stair guard vertical components terminate in a bottom rail instead of terminating into the treads, a gap is created between the guard bottom rail, the risers, and the treads. This gap should not be large enough to pass a 6-inch-diameter sphere. Figure 2 and Photo 1 provide examples of this situation.

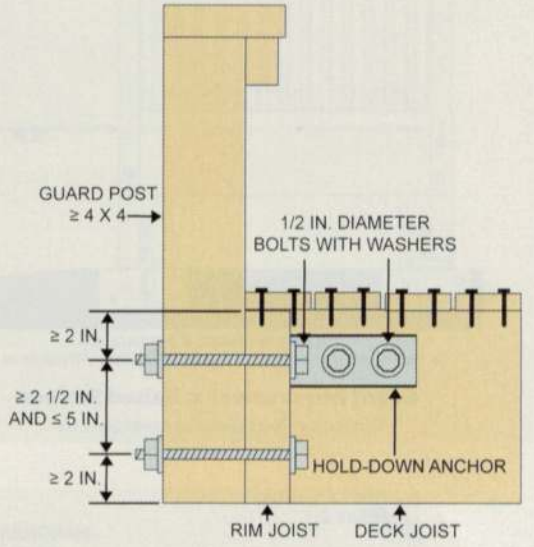
Another easy miss when looking at guards is open stair risers, such as stairs serving exterior decks and porches. Open risers that are more than 30 inches above the floor or grade may not allow passage of a 4-inch-diameter sphere. ▸▸

Figure 3



Guard Post Connection at Rim Joist Between Deck Joists

Figure 4



Guard Post Connection to Rim Joist at Deck Joist

Guard strength and durability

Many of us know that a guard should withstand a 200-pound concentrated load applied at any point along the top in any direction. We don't carry equipment to measure this, so we should use our professional judgment (as required by our standards). You may call a guard deficient or recommend evaluation if the guard seems loose or if you believe that the fasteners may fail at some point in the future.

Fastener failure is a particular issue for deck guards. In the old days, not really that long ago, we'd notch a 4x4 post and nail it to serve as a principal support for deck guards. That would pass inspection, and it would work for a while, but eventually the nails (which have very little pull-out resistance) would pull out and the guard would fail. We improved this situation by bolting a full 4x4 to a band board. Unfortunately, this method still relies on the nails that secure the band board to provide much of the structural integrity. Eventually, the nails would pull out and the guard would fail. Best practice now suggests that deck guard support posts be mechanically fastened to the deck floor joists. Figures 3 and 4 show examples of how this might be accomplished.

Reporting older deck guards

Our Standards of Practice require us to report conditions that we believe are unsafe. Guards and handrails are often cited as examples of components that may have been considered acceptable in the past, but may no longer be considered safe. Guards with wide opening spaces are a good example. A child could be trapped in such guards and be injured or killed. Guards with components that can deflect and create wider opening spaces are another good example.

There is no grandfathering of safety issues. You should report that a guard is unsafe if, in your professional judgment, you believe that it presents a significant risk of bodily injury during normal daily use regardless of whether or not the guard may have been accepted at some point in the past. How you report your finding depends on the situation. Some you will report as a deficiency that should be corrected. Others you will report as situations that need to be evaluated or monitored for future correction.

The bottom line

Guards help protect people from injury or death from accidental falls. While performing this important service, they should not create other hazards such as strangulation and entrapment of children. We should alert our clients to potential guard safety issues when necessary.

Memo to the gods that guard us: The Word does not reside on Mt. Olympus (just at its base) and welcomes other viewpoints. Send your lightning bolts or emails to Bruce@DreamHomeConsultants.com. The thoughts contained herein are those of The Word. They are not ASHI standards or policies. ■

Bruce Barker, Dream Home Consultants, Peoria, Ariz., has been building and inspecting homes since 1987. He is the author of "Everybody's Building Code" and currently serves as chair of the ASHI Standards Committee. To read more of Barker's articles or if you need a presenter at your next chapter event, go to ***www.dreamhomeconsultants.com****.*