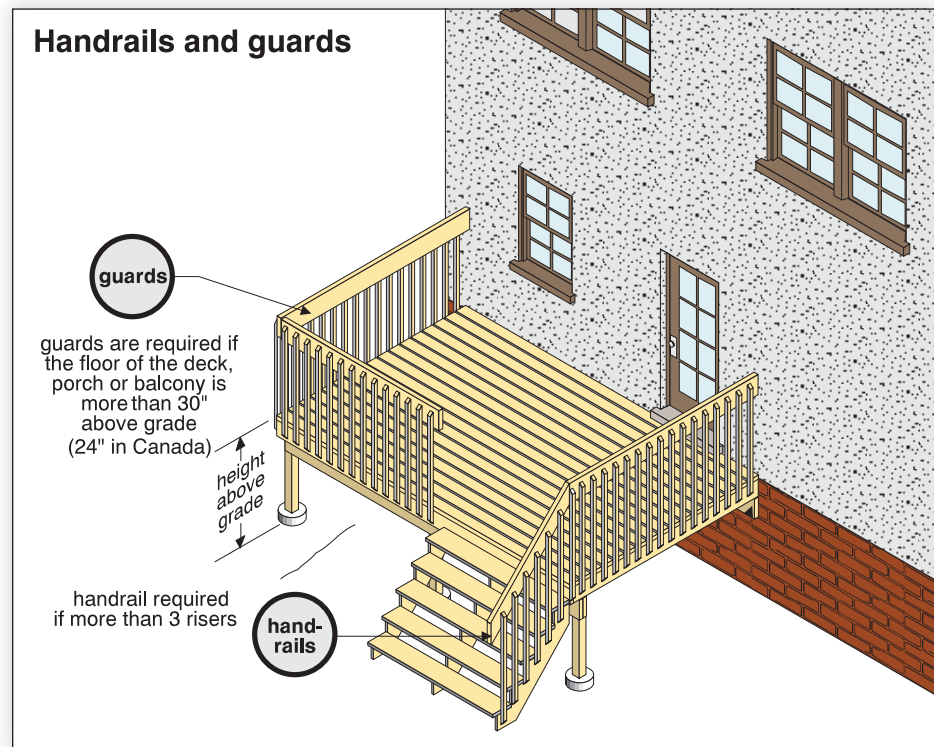


3.2 Railings (handrails and guards)

Handrails provide something to hold when going up or down stairs. **Guards** or **guardrails** keep people from falling off landings, decks, balconies and the open sides of staircases.

WHEN NEEDED Handrails and guards are safety devices. The implication of non-performance is, of course, falling. Rules vary by jurisdiction. Exterior guardrails are typically required on any porches, decks, or balconies more than 30 inches (US) and 24 inches (Canada) above grade. Check your local building standards to see which applies.

WIDE STAIRWAYS In most cases, handrails are needed on only one side of the stairwell as long as the stairs are not more than 44 inches wide. A staircase that is over 44 inches wide may need handrails on both sides.

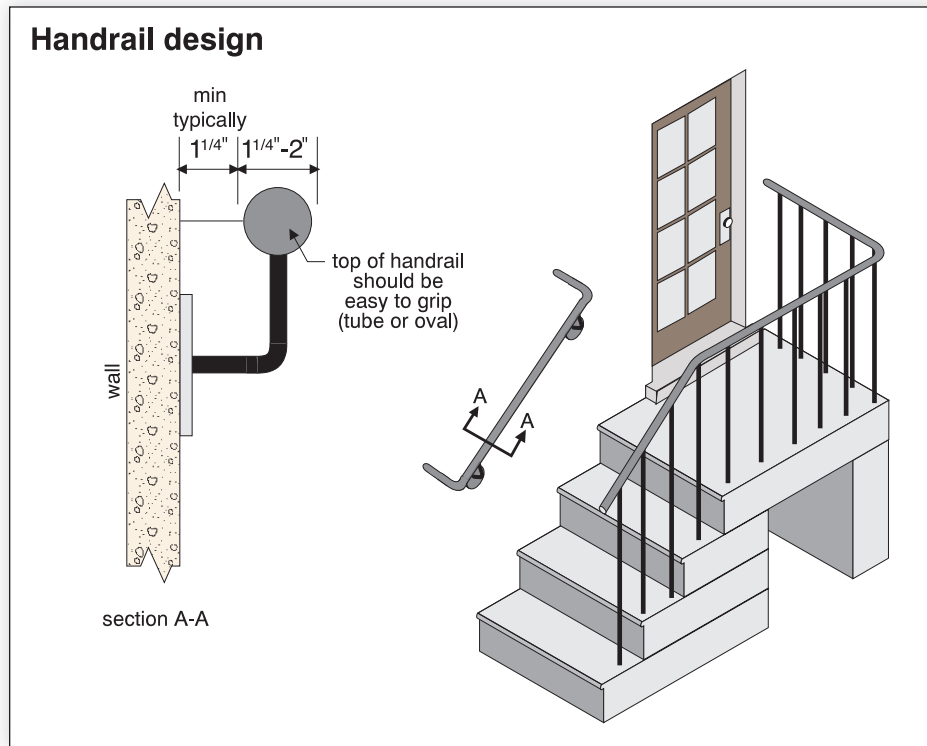


STRONG AND EASY TO GRAB

Common sense dictates that the handrails must be strong enough to support someone's weight if they stumble. They must also be easy to grab. The handrail section should be at least 1½ inches out from any wall so you can get your hand around it, and the part that you grab should be roughly 1½ inches across the top surface.

2 X 6 HANDRAIL

A two by six (2 x 6) on edge can meet these criteria and still be a poor handrail. Good handrail design includes a shape at the top that can be easily grabbed in a panic. Grabbing and holding the top of a straight two by six railing may be difficult. The top of the railing should form a tube or oval, for example, so that you can easily wrap your hand around it.



GUARDS Guards should be at least strong enough to support the weight of people leaning against the guard. Many are not.

3.2.1 Conditions

1. Missing or loose
2. Rot or insect damage
3. Spindle problems
4. Too low

3.2.1.1 MISSING OR LOOSE

While guards may not be required unless the steps, deck or landing are more than 24 to 30 inches above grade, falling backwards off a deck 2 feet above the ground is dangerous. Irrespective of local building standards, you can offer clients your professional opinion. It's up to your clients whether they provide a guardrail. You do not want to recommend less than what the local building standards are, but you can make recommendations that go beyond the minimum.

CAUSES Railings may be loose because of –

- rotted wood
- rusted metal
- improper fasteners or corroded fasteners
- an original design or installation with inadequate strength

IMPLICATION The implication of missing or loose handrails and guards is a life safety concern.

STRATEGY The first step is to ensure that handrails and guards are provided.

Railings that are loose are even more dangerous than those that are missing, because they provide a false sense of security. Use every railing and pull on it with progressive and considerable force to ensure that it is secure. Do not lean on a railing or push out on it in such a way that if it lets go, you would fall. Check the end post to ensure it is adequately attached to the exterior wall to prevent deflection. Railings that are freestanding at one or both ends are much more difficult to build well. Pay particular attention to these.

RUSTED RAILINGS Metal railings on concrete surfaces usually rust first at their point of penetration into a concrete base. The rusting metal expands and, in some cases, cracks the concrete. The railing may not be very strong. Watch also for damaged concrete where metal railings are attached.

3.2.1.2 ROT OR INSECT DAMAGE

While a wood handrail or guard may look secure, closer investigation and probing with a screwdriver, for example, may reveal rot and/or insect damage.

CAUSES This may be caused by –

- poor drainage
- missing or deteriorated paint or stain
- horizontal surfaces that trap water
- old wood
- wood/soil contact

Rot may be caused by poor drainage from the landing, steps, porch, etc. A railing should not interfere with the drainage of water off the surface. This will rot not only the railing, but the surface that is not effectively drained.

Another cause of rot is failure to paint or stain the railing.

Horizontal details that hold water lead to rotted wood. Anything that impedes drainage and quick drying will shorten the life of a railing.

Insect damage is common in rotted wood. It may also be found in wood which is not damaged.

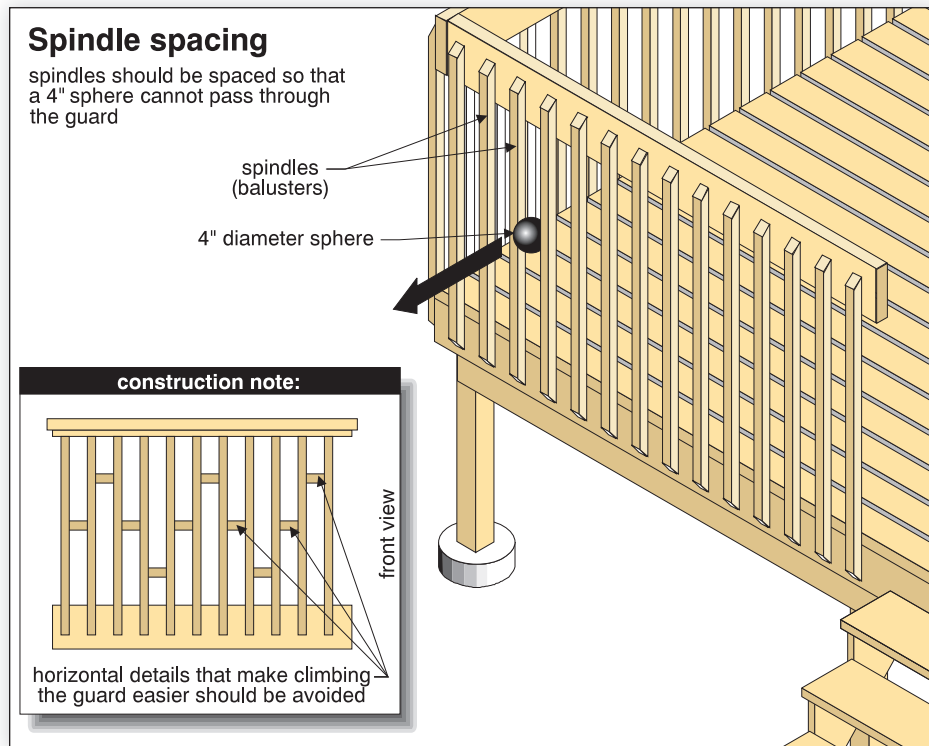
IMPLICATION Life safety is the implication.

STRATEGY Look closely at railings, particularly at bottom members, and at horizontal details. Pay particular attention to end grain. These areas tend to rot first.

3.2.1.3 SPINDLES MISSING OR INEFFECTIVE

Guards must be constructed so that people cannot fall through. This is particularly important where young children may be expected to test railings. In some jurisdictions, spindles (also called balusters) must be designed so that no opening will allow a 4 inch ball to pass through.

Spindles should be substantially vertical. Railings with many horizontal details are easily climbed by children and, as such, are a safety hazard. These are not allowed by some authorities.



CAUSES These are design issues. Custom-designed railings are often the worst offenders from a safety standpoint with respect to spindle spacing and climbability.

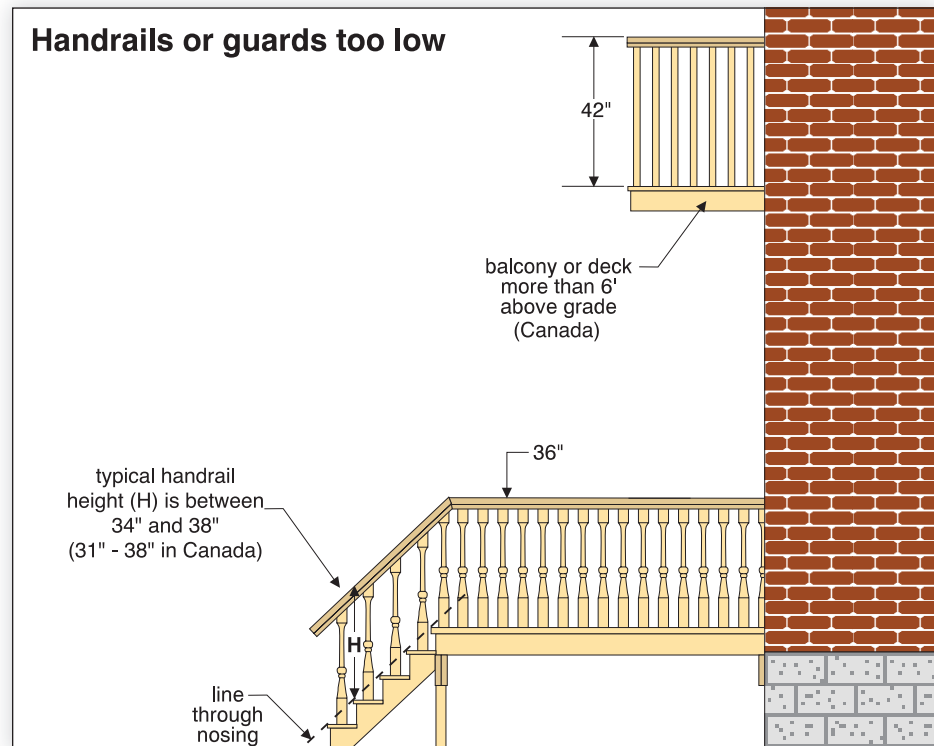
IMPLICATIONS Inadequate spindles are a life safety issue.

STRATEGY Use common sense when looking at guards and think about toddlers and small children who love to climb.

TERMINOLOGY Some people refer to spindles in railings as **balusters**. The entire railing system may be called a **balustrade**. Freestanding posts at the ends of railings (particularly at steps) are often called **newel** posts.

3.2.1.4 TOO LOW

- HANDRAILS** Handrails must be at a height that the average person can grab readily as they go up or down steps. Some jurisdictions require railings to be 32 inches to 38 inches above the nosings of the steps. In other jurisdictions, they have to be 34 inches to 38 inches above nosings. Check your area requirements, but in general it should hover around 35 or 36 inches high, or roughly 3 feet. Any large deviation from this should raise a red flag.
- GUARDS** In many areas, the guardrails must be 42 inches high around landings, decks and balconies. In other areas, they can be only 36 inches high if the deck is less than 6 feet off the ground.
- DIFFERENT RULES** It's important to note that the required height of handrails going up the stairs may not be the same as the required height of the guardrails at the landing around the top of the stairs.



CAUSES The cause of incorrect handrail or guardrail height is an original construction issue. People seem to get taller with each successive generation, and, in many old buildings, handrails and guardrails are considerably lower than what we would build today.

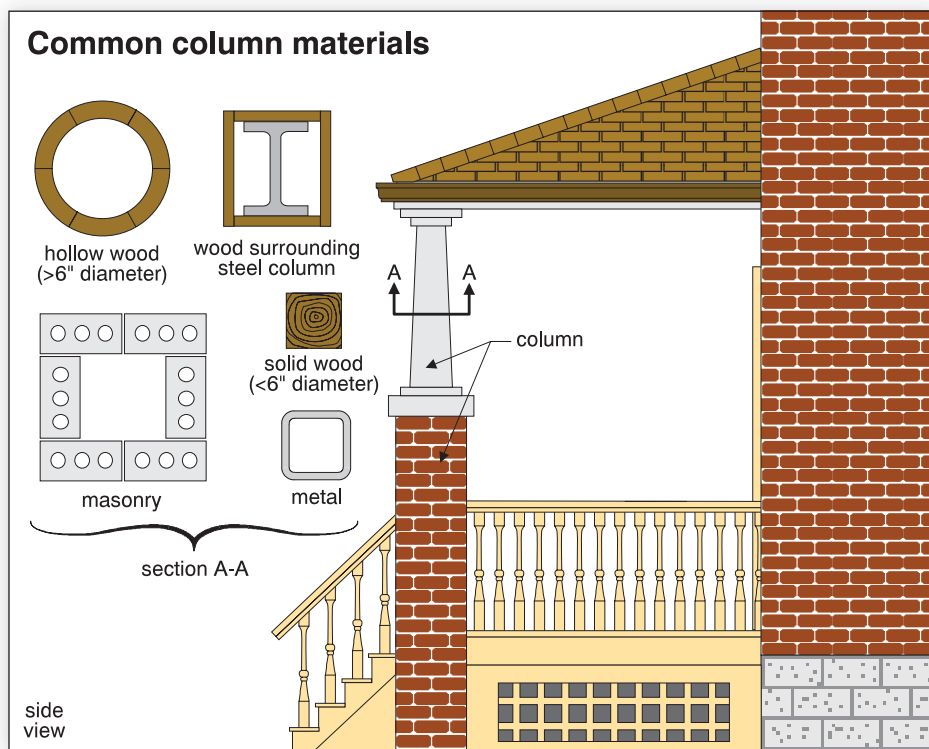
IMPLICATION The implication is life safety.

STRATEGY From a safety standpoint, you may want to recommend that the railings be replaced. However, these are often an architectural feature that clients will not want to give up. Raising the issue and ensuring your clients understand the implications is enough for a home inspector. It is not your role to persuade people to make changes to the house, especially on something as subjective as this. Temporary handrails and guards or extenders are possible solutions to maintain architectural appeal over the long term and protect a busy youngster in the short term.

Pay close attention to integral bench railing systems. While convenient, this type of rail is easily climbed and walked on, which creates a fall hazard, particularly for small children. Look for any type of railing that can be easily climbed and note it as a defect in your report.

3.3 Columns

FUNCTIONS Columns typically support the floors and roofs of porches or **porticos** (small roof assemblies over entrances supported by columns). They may also support decks, overhanging living spaces, carports or balconies. Columns transfer loads from joists or beams to foundations or footings or both.



MATERIALS Columns can be made of several materials and may be a combination of materials. Some columns have a wood upper section and masonry lower section. Most round wooden columns larger than 6 inch diameter are hollow. They are made like barrels. Wooden columns can be solid square lumber.

Some columns are metal. They can be circular or rectangular; the majority of metal columns are hollow. Some poured concrete decks or porches have solid concrete columns. Masonry block columns will also be found. In some cases, wood or steel columns are surrounded by decorative brick.

3.3.1 Conditions

Common column problems include the following:

1. Leaning, settled or heaved
2. Spalling or cracked
3. Rot, insect damage, wood/soil contact or rust

3.3.1.1 LEANING, SETTLED, OR HEAVED

Most of the time, it is safe to assume that a column was installed straight and plumb.

CAUSES Columns may shift because of –

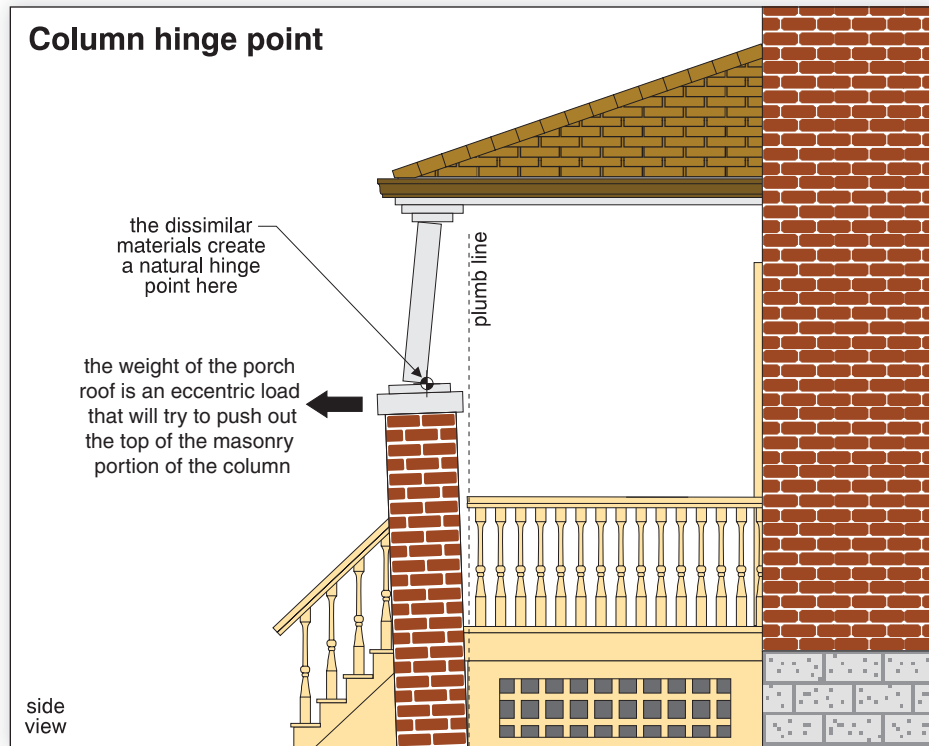
- inappropriate foundations and footings
- soil erosion
- frost heave
- mechanical damage (e.g. vehicle impact)
- greater loads than were intended
- eccentric loads (off center)
- deterioration of the column or its connection points
- columns poorly secured at their top or bottom

IMPLICATIONS Columns that have moved may allow the structure they support to fail. These columns may be expensive to stabilize.

STRATEGY Look carefully at columns, particularly the top and bottom, for evidence of movement. Look at the column from several angles. When standing on the street looking at a house, columns that are out of plumb to the left or right will be visible, but a column that is out of plumb leaning toward the street may not be noticeable.

When inspecting decks, if it is built over a ravine, the footings can shift if the soil support is poor this can lead to shifting in the deck, which is a significant deficiency. In most cases, decks are supported by pressure treated four by four (4 x 4) or six by six (6 x 6) posts. For taller decks and second floor balconies, six by six posts with a bigger cross section will be required. Look at the posts from a distance do they appear to be under-sized (too slender) for the application?

IMPACT DAMAGE If a column is near a laneway or driveway, and has moved or shifted, look for damage that may suggest vehicle impact.



HINGED JOINTS Where columns are made of dissimilar materials (bottom brick, top wood) a natural hinge is created and any eccentric loading (load applied off center of the column) will cause the column to bend at the hinge point. A gap will develop between the two sections.

PUSH ON COLUMN Push on the column near the bottom and near the top, if possible, to ensure that it's well anchored.

RACKING TEST Where wooden decks are well off the ground, stand on the deck and shift your weight from side to side to see if the deck moves. If so, diagonal bracing may be necessary. Do the same test on carport roofs.

ROT AND RUST Wood columns sitting in the soil or directly on concrete will eventually rot. The bottom of a metal column will rust if it's too close to the soil. Metal and wood columns should have footings that extend above ground more than four inches.

3.3.1.2 SPALLING OR CRACKED MASONRY

CAUSES Spalling results from water absorption and subsequent freezing. Cracking can be caused by settlement, heaving, or freezing.

IMPLICATIONS Severe spalling or cracking will weaken the column. This could eventually lead to collapse.

STRATEGY It's common for brick and block columns to spall and lose mortar at ground level. Often the side of a masonry column most exposed to rain will suffer the most damage.

Masonry will wick water up out of damp soil. This is called **rising damp** in some areas. The moisture will escape by evaporating off the surface of the masonry in warm weather, sometimes leaving efflorescence on the face of the column. In cold climates, the moisture will freeze in the masonry, leading to spalling.

3.3.1.3 ROT, INSECT DAMAGE, WOOD/SOIL CONTACT OR RUST

STRATEGY Wood columns are susceptible to rot and insect damage, which have been discussed in this Course. Watch for wood/soil contact and horizontal surfaces that collect water. Use a screwdriver or awl to probe surfaces, especially at the base of columns.

DECK POSTS AND FOOTINGS For decks, have a look at the posts that are supporting it. Note any modified or significantly damaged or deteriorated posts. Ideally, the posts sit on precast concrete piers that extend down into soil below the frost line. Note any wood/soil contact as a possible point of insect damage or rot.

Metal columns are susceptible to rust, which has also been discussed in this Course. The base is particularly vulnerable.