



SafeChurch® Deck Collapse Prevention

The number of people who have been treated for injuries in emergency rooms across the United States from collapsing decks, balconies, and porches is dramatically increasing. In a study conducted by the Consumer Product Safety Commission (CPSC), 224,000 people were injured nationally from 2003 to 2007 due to a deck or porch. Nearly 15 percent of these injuries were from a structural failure or collapse.

Listed below are some examples of collapse accidents:

- *In June 2015, six college students died in Berkley, CA when a balcony collapsed.*
- *In 2003, a porch fell in Chicago and killed 13 people and injured 57.*
- *In 2003, a church camp in Alabama had a deck collapse, sending 34 campers to the emergency room after falling 12 feet onto the concrete below.*

GuideOne also has experienced these types of claim. A church camp's wooden deck suddenly collapse where it had pulled away from the building as campers were standing in line waiting to enter the dining hall. Five people were seriously injured requiring surgeries and medical stays.



The photo shown here was taken after the accident. Note the complete collapse of the wood deck to the ground and the distance of the fall.

Connections are Critical

The main sources of deck collapse are failures of the connection between the deck ledger board (where the deck attaches to the building) and the building. The U.S. Forest Products Laboratory says that “nearly every collapsed deck has been attached with nails, rather than bolts, and investigators have pinpointed nails as the cause of the collapse.”

Screwed-in connections offer greater strength than nails. Lag bolts provide as much as nine times the pullout resistance of a nail.

Inspection Items

- **Split or decaying wood** – Inspect the ledger board, support posts, joists under the deck, in particular. Also look at the deck surface, railings and stairs. Be aware of damp areas that may cause decay or rust to fasteners.
- **Flashing** – Moisture and debris should not collect between the building and the deck. Flashing should be installed above the ledger board and behind the exterior cladding to prevent entry of water into the building. Flashing should be replaced if water is allowed to collect.
- **Loose fasteners** – Expansion and contraction of wood decking causes fasteners to loosen. Fasteners should be kept properly tightened.
- **Rusted or corroded fasteners** – Water can cause metal to corrode. Look for visible signs of rust and any deteriorated fasteners that should be replaced.
- **Stairs and ramps** – Handrails, guard rails, banisters, steps and ramps should be properly secured and firmly in place.
- **Maintenance** – If mildew is present or the deck covering has worn away, the deck should be properly cleaned and sealed with an approved waterproof sealant/stain. This will preserve and protect the wood from splitting and decaying and will help keep the fasteners intact.

Common Code Violations

- **No protection against decay** – Structural elements should be preservative-treated lumber, not standard grade lumber.
- **Too few or inadequate fasteners** – Untreated fasteners can rust and corrode within a year. Fasteners should be hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze, or copper.
- **Insufficient support, anchoring and overloading** – All deck design specifications should meet or exceed applicable building codes for the jurisdiction involved. Know the carrying capacity of the deck. Having too much weight on the deck can lead to collapse. Consider hiring a structural engineer to identify the load limits of the deck.

Additional Safety Items

Even though these are not directly related to preventing collapse, the safety items listed below will help minimize the potential for an accident from falls associated with decks.

- **Handrails** – Any flight of stairs having four or more risers should be equipped with a handrail. Handrails should be between 34 inches and 38 inches high.
- **Railings** – Railings are installed to prevent someone from falling off the leading edge of the deck or balcony. Local building codes will dictate when a railing is required, and in most jurisdictions, the minimum height from the ground is 30 inches. The height of the railing should follow local building codes, but is typically between 42 and 48 inches tall. To prevent someone from falling through the railing, balusters or spindles are typically installed. The distance between rails should be less than four inches.
- **Lighting** – Lighting should be provided for stairways. Look for shadows that may be created and adjust lighting accordingly.
- **Keep clear** – Remove any leaves, sticks, debris and formation of mildew that can create slip and fall hazards. Stairways should be kept clear of decorations, planters and other items that can hinder egress and present a trip and fall hazard.
- **Overhanging trees** – Look for overhanging tree branches that are dead or decaying and promptly remove. These can break free and fall onto the deck surface, causing damage to the structural components and injuring people.

Conclusion

- Deck safety begins with proper design and construction specifications. Weight load requirements must be designed for and corners must not be cut on building materials.
- After construction, the footings and connectors should be inspected at least annually to confirm that connectors have not loosened and wooden components have not deteriorated. Consider hiring a professional to perform this inspection. This will ensure that the structure has been thoroughly examined to identify any problem areas.
- Loosened/rusted connectors or rotting/deteriorating wooden components must be replaced.

A collapse of your deck, porch or balcony can cause serious and even fatal injuries, as well as property damage. By following the safety guidelines listed, your chances of a major collapse and injury will be reduced.