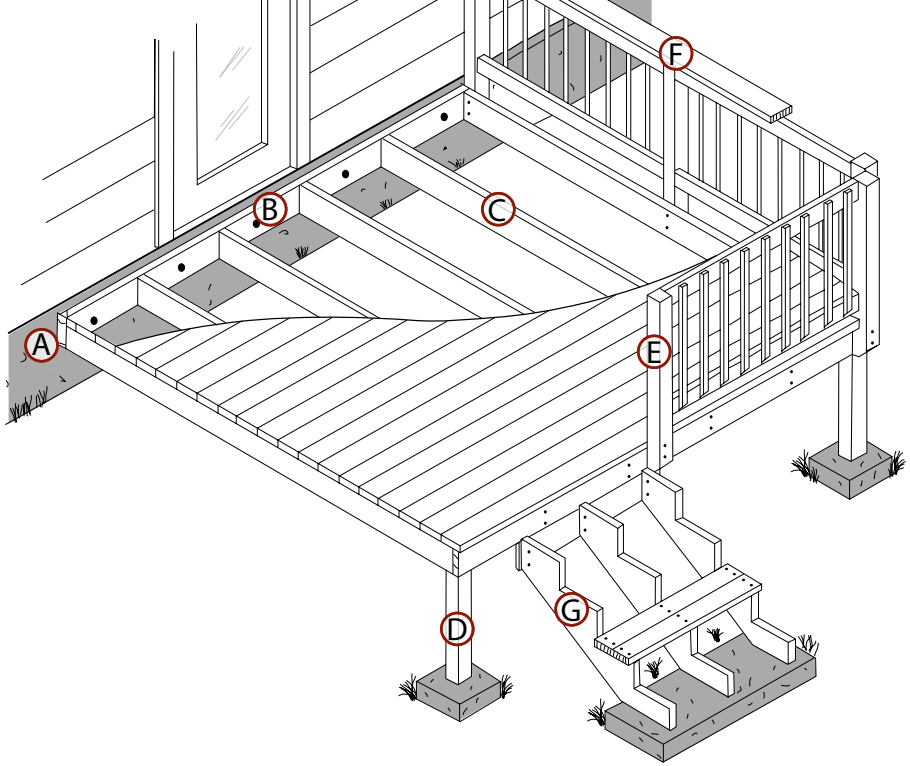
Residential Deck Failures

Based on data from the Consumer Product Safety Commission, more than 6,000 people are injured each year in incidents involving the structural failure or collapse of a deck or porch. In recent years the experts at Robson Forensic have investigated more than 50 such incidents. In this document we attempt to highlight some of the most common causes of failure and steps you can take to safeguard your investment and your family.

Anatomy of Deck

In support of a technical discussion regarding the failures or defects of the deck in your case, we have provided accepted industry vocabulary below:

A) Band Joist – section/portion of house to where deck is directly attached.
B) Ledger Board – primary board that attaches deck to house.
C) Deck Joist(s) – members that support deck flooring.
D) Support Post(s) – member that provides stationary vertical support of deck
E) Railing Post(s) – member that provides the main lateral support for the safety railing
F) Railing – a protective barrier that usually consists of a series of horizontal and vertical supports
G) Stringers – support beams for stairs and hand railings.



Failures Modes, Design Parameters & Prevention

Pulling Away From the House

The most common mode of total deck collapse involves the deck "pulling away" from the house. This type of failure typically occurs because the ledger board was not properly attached to the house. There are many construction aspects that go into assuring the ledger board is properly attached. ***Primary Questions:*** *Were lag or carriage bolts used? If so, are they the correct type, size, spacing, and depth? What was the ledger board connected to? Was flashing used to prevent water damage? Did the contractor use the correct hardware?*

Failure of Support Posts & Joists

Structural failures also occur involving the support posts and deck joists. ***Primary Questions:*** *Were the posts sized correctly based on overall height? Were the post foundations installed below the frost line, and did it follow the '7 Foot Rule'? Was proper lateral bracing installed on each post? How were the deck joists attached to the ledger board?*

Railing Failures

There are more injuries related to railing failures than any other portion of a deck. Investigations often reveal that railing posts were not installed correctly and could not withstand the specified lateral load requirements. ***Primary Questions:*** *Did the design/construction use the appropriate connections? Have railing posts been modified at the base? What is the post spacing? Were railings built to the appropriate height, with correct baluster spacing?*

Design Parameters

A properly designed and constructed deck can support a reasonably expected load of people, snow and objects (40-60 PSF). The design must also be able to resist the lateral and uplift loads that are generated by people, wind, or seismic activity. Railings must be able to safely resist a 200 pound lateral force.

Annual Inspection Checklist

The North American Deck and Railing Association has established May of each year as "Deck Safety Month" as the time for homeowners to inspect their deck. NADRA provides a 10 point checklist for deck owners. The following is a summary list that highlights deck components and areas that should be inspected annually:

- Check for split or decaying wood – especially on the ledger board, support posts and joists.
- Inspect all fasteners and connection points - look for rust/corrosion and protruded nails.
- Assure that there is no water ponding or collecting around support posts.
- Make sure that deck flashing is still in place and functioning.
- Check all railings and handrails. Make sure the posts are firmly connected and can withstand lateral loads. Inspect the baluster spacing. Assure that the hand railing is not frayed and has no splinters.
- Steps - assure that the stringers are not split/checked and the handrails are still firmly attached.

Contact an Expert:

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The variety and depth of Brent's experience over the past 35 years is significant. He worked in the construction trades prior to pursuing his engineering degree. He has hands-on experience pounding nails and laying brick, as well as providing construction engineering and managing the construction of multi-million dollar projects.

Brent heads the Civil Engineering group at Robson Forensic and can help put you in touch with an expert whose qualifications best meet the demands of your case.