DECK LEDGER FLASHING AND STAIR SOLUTIONS (BCD308)

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Course Description

One of American Wood Council's most commonly downloaded publications is the Prescriptive Residential Wood Deck Construction Guide (DCA6). This presentation provides a deck experts perspective on deck construction which is not included in DCA6. One of the leading contributors to exterior deck collapses is decay of the supporting structure - namely the rim joist of the house - due to poorly detailed or damaged deck ledger flashing. This program will examine a step-by-step flashing process that protects the wall behind the ledger and flashes over the top to block and redirect water onto the face of the ledger and cladding at three critical areas. A flashing approach to seal cantilevering deck / balcony joists where it penetrates through an exterior wall and WRB will also be examined.

Also discussed are solutions to address critical deck stair support, connections, construction and safety details: specific attention to the top of a stairway to the deck; the required footing at the base of a stairway; stairway landings; riser openings and stabilizing the bottom stairway guard post.
LEARNING OBJECTIVES

Upon completion, participants will be better able to:

1. Describe Redundant Ledger Flashing
   Describe a redundant ledger flashing system that reduces the chance water leakage into the wall assembly of the dwelling

2. Identify IRC Provisions
   Identify IRC provisions for deck ledger flashing and label the layers of a ledger flashing system

3. Differentiate Frost-Line Requirements
   Differentiate between decks that require stairway footings that extend below frost line from decks that do not require frost-depth footings

4. Describe Common Issues
   Describe common issues with deck stairway to deck frame attachments

Polling Question

1. What is your profession?
   a) Architect
   b) Engineer
   c) Code Official
   d) Builder/Product Manufacturer
   e) Other
Ledger Flashing

Ledger Flashing Material, Location and How it's Installed

R703.4 Flashing

Approved corrosion-resistant flashing shall be applied shingle-fashion in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components.

Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714.”

Flashing shall extend to the surface of the exterior wall finish. Approved corrosion-resistant flashings shall be installed at the following locations:

- "Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction”
**Ledger Flashing Material**

**R507.2.4 Flashing**

"Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm) or approved nonmetallic material that is compatible with the substrate of the structure and the decking materials"

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**Ledger Flashing**
Head Flap in WRB

Prepare Self-Adhering/Sealing Membrane (SAM)

Sheet width = 3 in. to 6 in. wider than ledger board
Sheet length = 3 ft. to 5 ft.
Score backing sheet 2 in. up from bottom
Score Backing Sheet of SAM

Leave Bottom Strip of Backing Sheet on SAM
Bond SAM to Sheathing

Extend first sheet 3 in. to 6 in. past end of ledger
Apply additional pieces overlapping previous by ~4 in.

Fasten Ledger Over SAM

1” – 3”

3” – 6”

2” – 3”
Score Backing Sheet on Ledger Flashing SAM

6 in. – 8 in. wall leg + 2 in. to 3 in. ledger leg

Dry-Position SAM on Ledger – Extend ~6 in. Past End
Remove Narrow Ledger Strip of Backing Sheet

Bond SAM to Top and Face of Ledger
Remove Wall Strip of Backing Sheet

Avoid Bridging Inside Corner and Bond SAM to the Wall
Make Relief Cut in SAM at Inside Corner at End and Fold Down

Apply Additional 3ft. – 5ft. Long Strips
Minimum 0.019 in. Metal OR Approved Flashing

Polling Question

2. According to the 2018 IRC section R703.4, “flashing shall extend to the surface of the ________.”
   a) water-resistive barrier
   b) counterflashing
   c) exterior wall finish
   d) deck ledger surface
   e) none of the above
Ledger Flashing Size

Wall leg of flashing

>5 in. preferred

Ledger Flashing Size

Stock Flashing examples

1-1/2 in.

4 in.

Counterflushing may be needed
Ledger Flashing Size

How high must siding be above the deck surface?

- Vinyl = ¾” min
- Cedar lap = 2” min
- Cedar shingle = ½” min
- Fiber cement = 1” to 2” min (by manufacturer)
- Composite wood siding = 1” min (by manufacturer)
Caution:
Debris Trap at decking joint

Alternate Flashing Profiles

Caution:
Debris Trap at decking joint
Alternate Flashing Profiles

Shims create drain space

Alternate Flashing Profiles

Ledger dropped ½ in.
Sloped cap flashing drains
Debris washes out
**WRB head flap over flashing (counter flashing)**

**Head Flap Corner Tape**
**Siding Beneath Ledger – Lift Strip of SAM Over**

R703.4 Flashing

"Flashing shall extend to the surface of the exterior wall finish”

**Trim Excess SAM Not Covered by Trim Piece**
Bond SAM to Head Lap of Siding. Apply Trim Over.

Trim Excess SAM Not Covered by Trim Piece
Polling Question

3. Which of the following type(s) of siding may require a 2-inch air space above a deck?
   a) Red cedar shingles
   b) Some fiber cement brands
   c) Western red cedar lap siding
   d) Vinyl siding
   e) Answers b) and c)

Spacing Ledger Off Wall

½ in. space
Max 1 in. ledger to rim joist

Flashing

½-in. max.
stacked galvanized
or stainless washers

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Spacing Ledger Off Wall

Cantilever Joist Flashing
Flexible Flashing Tape

Remove Half of Backing Sheet
Bond to Bottom and Sides of Joist

Bond to Bottom and Sides of Joist
Remove Other Half of Backing Sheet

Flare Flexible Tape Onto WRB
Cut Head Flap in WRB Above Joist

Remove Backing Sheet from Top Strip of Flexible Flashing Tape
Bond Tape Around Top and Sides

Bond Tape Around Top and Sides
Remove Backing Sheet from Wall Leg of Tape

Flare Wall Leg of Tape Over WRB
Flare Wall Leg of Tape Over WRB

Fold Head Flap In WRB Down Over Tape
Tape Over WRB Head Flap Cuts

Protect Flashing Tape with Metal or Plastic Strip Before Siding
Deck Stairs

- 2018 IRC Section R507 Exterior Decks
  - Silent on stair details
- DCA6
Deck Stairs

- Attaching the top of stringers to the deck frame
- Footings for the bottom of the stringers
- Securing guard posts at the bottom of stairway
- Other details commonly overlooked
Stringer – Attachment to Deck Frame

Stringer – Attachment to Deck Frame

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Stringer – Attachment to Deck Frame

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Can the Deck Frame Support the Stair Load?

- R311.5 Landing, Deck Balcony and Stair Construction and Attachment

“Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting.”

- DCA6 and IRC Tables based on 10 lb dead load and 40 lb live load
Can the Deck Frame Support the Stair Load?

![Image of deck and stairs]

Can the Rim Joist Support a Stair Load?

Can the cantilevered joists support a stair load?

![Image of deck frame and cantilevered joists]
Can the End Joist Support the Stair Load?

Can the beam support a stair load?
Can the ledger support the end joist with the stairs attached?

Self-supporting stairs

R311.5 "... or shall be designed to be self-supporting."
Footings and Posts at Head of Stairway

Header Fastened Beneath Rim or End Joist
Polling Question

4. What is the total load (live + dead) that the tables for Beam Spans, Ledger Fastener Spacing, Maximum Joist Spans, and Footing Sizes are based on?
   a) 60 lbs/sf
   b) 50 lbs/sf
   c) 40 lbs/sf
   d) 90 lbs/sf
   e) None of the above

Header Fastened with Screws and Supported by Jack Studs
Connectors Fasten Stringers to Head

Stringer Connectors Installed with Connector Screws

- Connectors install a minimum of 3-1/2 in.
- Connectors install a minimum of 4-1/8 in.
Securing the Bottom Guard Posts

Stabilizing Bottom Guard Post

DCA6 Fig. 34

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Block Between Stringers – Behind Posts

⅓-inch HDG Threaded Rod Outside Post-Post
Block Between Stringer – Face of Risers

Stabilizing Bottom Guard Posts
Alt – Block Between Stringers – Tension Ties

Stair Footings

DCA6

Figure 34. Stair Footing Detail.

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Stair Footings

- Footing depth
  - Frost line when deck is supported by the dwelling
  - Min. 12 in. below undisturbed ground surface

![Figure 34. Stair Footing Detail.](image)

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Stair Footings

DCA6

![Diagram](image)

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Stair Footings

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**Stair Footings**

- Frost Depth

**Stair Landings**

R311.7.6 Landings for stairways
Stair Landings

R311.7.6 Landings for stairways

- Width of stairs (min)
- 3 ft. direction of travel
Stair Landings

- Width of stairs (min)
- 3 ft. direction of travel

Case for Durable/Hard Landing Surface

- **R311.7.7 Stairway Walking Surface**
  “…shall be sloped not steeper than 1 unit vertical in 48 units horizontal (2% slope)”

- **R311.7.5.1 Risers**
  Maximum deviation between risers – 3/8 in.

- **ICC publication: Deck Construction Based on the 2009 IRC**
  “There is no material specified by the IRC for stair landings; however, the intent is for a solid, stable material with an identifiable and measurable slope. Properly installed concrete, pavers, flagstone, brick or decking may all be considered suitable as landings.”
Cut Stringers

- Overcuts
- DCA-6

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This seems like a duplicate slide to my untrained eye.

Weeber, Marcie, 2/5/2020
Stringer Openings

R311.7.5.1 Risers

“At open risers, openings located more than 30 inches, as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter sphere.”

Stringer Openings

R311.7.5.1 Risers

“At open risers, openings located more than 30 inches, as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter sphere.”
Questions?

This concludes the American Institute of Architects
Continuing Education Systems Course