Deck Panel Discussion
DES301

Moderator: Lori Koch, PE
Panelists:
Matt Hunter, BCO
Loren Ross, PE
Mike Guertin

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COURSE DESCRIPTION

Do you have questions on deck design? Now’s the chance to ask the pros!

Renowned deck expert Mike Guertin joins AWC’s Matt Hunter, BCO, and Loren Ross, PE for a panel discussion on all things deck construction. Topics covered will include relevant International Residential Code (IRC) references, AWC’s Design for Code Acceptance 6 (DCA6) – Prescriptive Residential Deck Construction Guide, and other relevant documents.

Attendees are asked to come prepared with plenty of questions – in this new panel discussion format we are encouraging participants to engage with our experts and help guide the discussion!
LEARNING OBJECTIVES

Upon completion, participants will be better able to:

1. Load Path
   Discuss deck load path code requirements and how to satisfy them

2. Significant Components
   Recognize proper design and detailing of significant components

3. Best Practices
   Identify best construction practices outlined in DCA6

4. Code Updates
   Indicate relevant analysis requirements and code updates

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WHY IS THIS IMPORTANT? DECK SAFETY!

“In my experience, none of the deck or guardrail collapse cases investigated were caused by occupant overloading. The number one issue is a lack of deck maintenance that requires annual inspection of a deck by a qualified person. I am not aware of any deck or guardrail failures wherein the deck had been inspected and repaired on an annual basis.”

- Frank Woeste, PhD, PE, Professor Emeritus, Virginia Tech
WOOD, FASTENERS, AND CORROSION

- Corrosion Resistance 2015 IRC R317.3 & 317.3.1
- These are the Minimums!
- What does the AHJ see day to day in Coastal Regions?
- Hot dipped galvanized carriage bolt at far right was less than 10 years old and was removed from a railing guard post in coastal North Carolina
- Wood preservative treatment may be a factor

WOOD, DECAY, FASTENERS, & CORROSION

Decks are not Permanent Structures without maintenance and repair
- Pay attention to the warning signs
- Look for staining, rust, and decay.
- The “usual suspect” locations are well known and documented
WOOD, DECAY, FASTENERS, & CORROSION

Rot, rust, and decay are relentless

- Are yearly inspections warranted?
- How many of you have wood decks and have removed fasteners for inspection?
- What does the photo in the upper right tell you?
- Photos in the bottom right?

SODIUM WET ION DEPOSITION-2018

(map of sodium ion wet deposition, 2018)
FASTENERS, CONNECTORS, AND HARDWARE

Considerations:
• Type of wood treatment?
• Corrosivity of treatment compounds?
• Contribution to structural performance?
• Difficulty of replacement, inspection, and repair?
• Initial cost versus replacement cost?
• Manufacturers recommendations?

AWC POLICY ON FASTENERS

AWC specifies best engineering practice:
• May exceed some specifications in IRC
• Performance criteria based upon Service Life

Hot Dipped Galvanized Materials
• What is the expected service life of structure?
• What atmospheric or geographic impacts are in play?
• What is the decay rate of the protective coating?

316 stainless steel is highly corrosion resistant
Silicon bronze, copper, or other materials may not be obtainable or practical
**ASTM STANDARD HD GALVANIZED HARDWARE**

**ASTM A123/A123M-treated after fabrication**

**TABLE 2: COATING THICKNESS GRADE**

<table>
<thead>
<tr>
<th>COATING GRADE</th>
<th>Mils</th>
<th>oz/ft²</th>
<th>µm</th>
<th>g/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>1.4</td>
<td>0.8</td>
<td>35</td>
<td>245</td>
</tr>
<tr>
<td>45</td>
<td>1.8</td>
<td>1.0</td>
<td>45</td>
<td>320</td>
</tr>
<tr>
<td>50</td>
<td>2.0</td>
<td>1.2</td>
<td>50</td>
<td>350</td>
</tr>
<tr>
<td>55</td>
<td>2.2</td>
<td>1.3</td>
<td>55</td>
<td>390</td>
</tr>
<tr>
<td>60</td>
<td>2.4</td>
<td>1.4</td>
<td>60</td>
<td>425</td>
</tr>
<tr>
<td>65</td>
<td>2.6</td>
<td>1.5</td>
<td>65</td>
<td>460</td>
</tr>
<tr>
<td>75</td>
<td>3.0</td>
<td>1.7</td>
<td>75</td>
<td>530</td>
</tr>
<tr>
<td>80</td>
<td>3.1</td>
<td>1.9</td>
<td>80</td>
<td>656</td>
</tr>
<tr>
<td>85</td>
<td>3.3</td>
<td>2.0</td>
<td>85</td>
<td>600</td>
</tr>
<tr>
<td>100</td>
<td>3.9</td>
<td>2.3</td>
<td>100</td>
<td>705</td>
</tr>
</tbody>
</table>

A: The values in micrometers µm are based on Coating Grade. The other values are based on conversions using the following formulas: mils=µm x 0.937; oz/ft²=µm x 0.02316; g/m²=µm x 7.067

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**Answering Your Deck Questions**

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**ASTM STANDARD HD GALVANIZED FASTENERS**

**ASTM A153 Class D & C**

**TABLE 3: Thickness or Weight (Mass) of Zinc Coating for Various Classes of Material**

<table>
<thead>
<tr>
<th>Class of Material</th>
<th>Average of Specimens Tested</th>
<th>Any Individual Specimen</th>
<th>Average of Specimens Tested</th>
<th>Any Individual Specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class C &gt; 3/8&quot;</td>
<td>1.25 (381)</td>
<td>1.00 (305)</td>
<td>2.1 (53)</td>
<td>1.7 (43)</td>
</tr>
<tr>
<td>Class D &lt; 3/8&quot;</td>
<td>1.00 (305)</td>
<td>0.85 (259)</td>
<td>1.7 (43)</td>
<td>1.4 (36)</td>
</tr>
</tbody>
</table>

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**Answering Your Deck Questions**
LOREN ROSS – CODE UPDATES

Answering Your Deck Questions

SIGNIFICANT CHANGES FOR DECK IN 2021 IRC

Snow Loading (RB 184)
Footings and Frost Protection (RB 187)
Deck Beam Assembly (RB 188)
Deck Beam Overhangs (RB 190)
Decking Spans (RB 191)
Guard Loading (RB 46)
SNOW LOADING (RB 184)

- Includes Loading of 40 psf live to 70 psf ground snow load
- Tributary area for footings and posts
- Joist format shows maximum overhang vs. joist span
- Beams of 4x neglected, use (2) 2x
- Large tables

FOOTINGS AND FROST PROTECTION (RB 187)

- Footings not needed for decks with joists bearing on ground

- Frost protection not needed if connected to structure not frost protected
**BEAM ASSEMBLIES (RB 188)**

Beams must be directly attached, not separated

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**DECK BEAM OVERHANGS (RB 190)**

Adjustment for beams with small or no overhangs

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### TABLE R507.6

**DECK BEAM SPAN LENGTHS**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SIZE</th>
<th>DECK JOIST SPAN LESS THAN OR EQUAL TO:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Southern pine</td>
<td>2 - 2 x 6</td>
<td>6-11</td>
</tr>
<tr>
<td></td>
<td>2 - 2 x 8</td>
<td>8-9</td>
</tr>
<tr>
<td></td>
<td>2 - 2 x 10</td>
<td>10-4</td>
</tr>
<tr>
<td></td>
<td>2 - 2 x 12</td>
<td>12-2</td>
</tr>
<tr>
<td></td>
<td>3 - 2 x 6</td>
<td>8-2</td>
</tr>
<tr>
<td></td>
<td>3 - 2 x 8</td>
<td>10-10</td>
</tr>
<tr>
<td></td>
<td>3 - 2 x 10</td>
<td>13-0</td>
</tr>
<tr>
<td></td>
<td>3 - 2 x 12</td>
<td>15-3</td>
</tr>
</tbody>
</table>

*Note: Values are in feet and inches.*
DECKING SPANS (RB 191)

Single and Multi-Span

<table>
<thead>
<tr>
<th>Decking Material Type and Nominal Size</th>
<th>Decking Perpendicular to Joists</th>
<th>Decking Diagonal to Joists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single Span</td>
<td>Multi-Span</td>
</tr>
<tr>
<td>5/4 inch-thick wood deck boards</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>2-inch-thick wood</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

GUARD LOADING (RB 46)

Separates Handrails and Guards
Guard loading not in every direction

For a guard system not required to serve as a handrail, a single concentrated load applied at any point along the top, in the vertical downward direction and in the horizontal direction toward the lower surface. For a guard also serving as a handrail, a single concentrated load applied in any direction at any point along the top.
MIKE GUERTIN – ADDITIONAL RESOURCES

Deck Design and Building Resources

Most decks designed by builder
Deck Design and Building Resources

AWC's DCA6
Deck Design and Building Resources

2018 IRC  R507

2021 IRC – This summer

Fairfax County, VA
Typical Deck Details
Deck Design and Building Resources
Fairfax County, VA
Typical Deck Details
Multiple span deck beam sizing table

Deck Design and Building Resources
Fairfax County, VA
Typical Deck Details
Ledger fastener table
Expansion and Adhesive Anchors
Deck Design and Building Resources

APA W345

Deck Design and Building Resources

SBCA – 1408-01

- Deck ledger to Floor truss
- Lateral load connection details

Attachment of Residential Deck Ledger to Metal Plate Connected Wood Truss Floor Systems

Structural Building Components Association (SBCA)

February 17, 2015, Revised August 15, 2017

Dashboard
Deck Design and Building Resources

SBCA – 1408-01

- Deck ledger to Floor truss
- Lateral load connection details

Deck Design and Building Resources

Product Manufacturers

- Evaluation Reports
- Installation Guides
Deck Design and Building Resources

Fine Homebuilding
Professional Deck Builder
Journal of Light Construction

Answering Your Deck Questions!
TIME FOR YOUR QUESTIONS!

Matt Hunter, BCO
AWC

Loren Ross, PE
AWC

Mike Guertin
Special Guest

Lori Koch, PE
AWC

This concludes the American Institute of Architects Continuing Education Systems Course