Inspector Association
WINTER UPDATE  2016

ADMINISTRATIVE UPDATE  UDC Program

Presenter: Scott Mau, Section Chief
Phone: 608-261-0342
Email: scott.mau@wisconsin.gov
7:45-8:45am DSPS Adm. Update - Scott Mau
8:45-9:45am UDC Revisions - Lenny Kanter
9:45-10:00am BREAK
10:00-11:30am DCA 6 - Jim Smith
11:30-12:30pm LUNCH
12:30-1:30pm UDC Rev/Appx C - Lenny Kanter
1:30-2:30pm UDC Revisions - Jack Wotruba
2:30-2:45pm BREAK
2:45-3:45pm Q&A, Res. L.L., E.C. - Lenny Kanter
The mission of the Department of Safety and Professional Services (DSPS) is to promote economic growth and stability while protecting the citizens of Wisconsin as designated by statute. DSPS and related professional boards protect the citizens of Wisconsin by ensuring the safe and competent practice of licensed professionals; performing inspections of commercial buildings, amusement rides, boilers, elevators, pressurized gas systems, and electrical systems; and performing plan reviews of commercial building, plumbing, fire suppression, elevators, boilers, and private onsite wastewater treatment systems.
ADMINISTRATIVE UPDATE

- DSPS Organization
- UDC Enforcement Contracts
- UDC Code Changes & Updates
- Web Site Applications
BUREAU RESPONSIBILITIES

- **Bureau of Technical Services**
  - Plan & Product Review
  - Commercial Building, UDC, Plumbing, Pools, Fire Protection Technical Consultation
  - Includes Building, UDC, Plumbing, Pools, Fire Alarm & Fire Suppression - where a plan review is involved.

- **Bureau of Field Services**
  - Field inspection, enforcement, audits, etc.

- **Administrative Services Section**
  - Plan Entry & Scheduling.
  - Field Support & Complaint Processing.

- **Fire Prevention, Public Sector Safety and Mine Safety Section**
  - Administer 2% Fire dues program including use of the National Fire Incident Reporting System and dues distribution to qualifying Fire Departments
  - Technical consultation with Fire Departments related to Fire Prevention and Inspection
  - Inspection of amusement rides, ski tows, and public sector employers
  - Mine safety training, consultation, and inspections
Secretary: Dave Ross
Deputy Secretary: Eric Esser
Assistant Deputy Secretary: Jeff Weigand
Division Administrator: Kirsten Reader
DIVISION OF INDUSTRY SERVICES

2 Bureaus:

- Technical Services, Amy Millard, Bureau Director
- Field Services, Vacant, Bureau Director
DIVISION OF INDUSTRY SERVICES
Technical Services

KIRSTEN READER
DIVISION ADMINISTRATOR (UNCLASSIFIED)
90-00 024781

JAN LIN
EXECUTIVE STAFF ASSISTANT
81-04 302296

AMY MILLARD
BUREAU DIRECTOR
BUREAU OF TECHNICAL SERVICES
81-01 000552

VACANT
EXECUTIVE STAFF ASSISTANT
91-04 (Lochner) 323032

STEVEN DORATZ
CHIEF, INTEGRATED SERVICES SECTION
81-02 062573

MARK ROQUETTE
CHIEF, INTEGRATED SERVICES SECTION
81-04 311403

DAVE WALLACE
ENG CONSULT-BLDG SYSTEMS-ADV
14-13 222061

ROBERT FRANKS
PLUMBING PLAN REVIEWER
05-03

DONALD HOUCH
PLUMBING CONSULTANT
05-04

JAN WOTRUDA
ENG CONSULT-UNIFORM DWELLING-ADV
14-13

JOHN FERDEK
PLUMBING PLAN REVIEWER
05-03

ROBERT JESKE
SUPPR SYSTEMS-ADV
14-13

THOMAS Prevention
ENG CONSULT-FIRE UNIFORM
14-13

VACANT
ENG CONSULT-BLDG SYSTEMS-ADV
14-13 (Conway) 327903

ANTHONY TADYSAK
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

GARY
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

SHANIN ZIM
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

WAUKESHA
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

310065

JASON HANSEN
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

G RAY
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

JOHN HANSEN
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

KRAUS
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

327866

MARK ROQUETTE
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

WAUKESHA
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

310051

DAVE WALLACE
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

WAUKESHA
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

327866

MICHAEL DUBOIS
PLUMBING PLAN REVIEWER
05-03

PHILLIP INGHAM
PLUMBING PLAN REVIEWER
05-03

WOLFE
PLUMBING CONSULTANT
05-04

VACANT
PLUMBING CONSULTANT
05-04

320132

TIM LABY
PLUMBING PLAN REVIEWER
05-03

BRUCE WENERS
PLUMBING CONSULTANT
05-03

VACANT
ENG CONSULT-UNIFORM DWELLING-ADV
14-13

HOLMEN
ENG CONSULT-UNIFORM DWELLING-ADV
14-13

327892

THOMAS Prentice
ENG CONSULT-FIRE UNIFORM
14-13

VACANT
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

DAVID GARCES
ENG CONSULT-FIRE UNIFORM
14-13

CRAIG MULDER
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

STEVEN RASMUSON
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

JOSIAH MONTGOMERY
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

VACANT
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

HOUMAN
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

302136

JACK MILLER
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

CRAIG MULDER
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

310065

DAVID LINTZ
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

HOLMEN
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

210059

MOURAD TAAPOUA
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

300166

VACANT
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

HOUMAN
ENG CONSULT-BLDG SYSTEMS-ADV
14-13

210059

GLEN JONES
PLUMBING PLAN REVIEWER
05-03

GLEN SCHMIDT
PLUMBING PLAN REVIEWER
05-03

MICHAEL LAMBERT
PLUMBING PLAN REVIEWER
05-03

RICHARD ROCHER
PLUMBING PLAN REVIEWER
05-03

Positions = 104.64

Org Chart 20160221
FIELD SERVICES BUREAU

- Robin Zentner, Section Chief over Commercial Building Inspectors
- Kim Schmitt, Section Chief over Boilers and Elevators
- Brad Johnson, Section Chief over POWTS
BOILER & PRESSURE VESSEL DISTRICT MAP

District 1
Douglas Bayfield Ashland Iron Vilas Florence Marinette
Burnett Washburn Sawyer Price Forest
Barron Rusk Clark Langlade Menominee Oconto
Taylor Price Oneida Shawano

District 1

District 2
Bayfield Marinette Brown
Bayfield

District 2

District 3
Schuyler

District 3

District 4

District 4

Phone   Fax
1 - Duane Leetch Lead Worker Duane.Leetch@Wisconsin.gov 715-559-8817 608-283-7431
2 – Temporary Assignment See Below
3 – Michael J. Schmidt MichaelJ2.Schmidt@Wisconsin.gov 920-360-2193 608-283-7433
4 - Terence Waldbilling Terence.Waldbilling@Wisconsin.gov 414-303-8575 608-283-7429
Supervisor Kim Schmitt Kim.Schmitt@Wisconsin.gov 262-524-3950
Submit general questions to; DspssBoilertechnical@wisconsin.gov

Contact Damarc Quality Inspection Services LLC (666-361-4321) for inspections outside of districts.

Temporary assignment: Buffalo/Trempealeau/Jackson Duane Leetch District 1
Adams/Juneau/Sauk Michael Schmidt District 3
La Crosse/Vernon/Monroe/Richland/Crawford Damarc Quality Insp
Scott Mau, Section Chief over UDC, Electrical & Fire Suppression Plan Review

Steve Dobratz, Section Chief over Commercial Plan Review

Tom Braun, Section Chief over Plumbing
ELECTRICAL DISTRICT MAP

District 1
- SW

District 2
- NE

District 3
- NW

Phone
1. Tony Tadysak  
   Anthony.Tadysak@Wisconsin.gov  
   262-895-9078
2. Craig Mulder  
   Craig.Mulder@Wisconsin.gov  
   608-444-5701
3. Steve Rasmusson  
   Steven.Rasmusson@Wisconsin.gov  
   608-617-2985
Supervisor – Scott Mau  
   Scott.Mau@Wisconsin.gov  
   608-261-0342
Submit general questions to:  
   DSPSSBElectricTech@wi.gov
Please leave a voice mail question, calls will be returned by staff.  
608-264-7823
COMMERCIAL BUILDING DISTRICT MAP

1. Charlotte Martin
   Chm.Marvin@Wisconsin.gov
   608-235-0579
   608-283-7478

2. Steve Gotthard
   Steve.Gotthard@Wisconsin.gov
   608-235-0568
   608-283-7474

3. Betty Wiene
   Betty.Wiene@Wisconsin.gov
   414-852-3694
   608-283-7467

4. Leonard Alexander
   Len.Alexander@Wisconsin.gov
   608-235-0582
   608-283-7384

5. Lucas Dederich
   Lucas.Dederich@Wisconsin.gov
   608-445-6558
   715-345-5269

6. John Anderson
   John.Ander@Wisconsin.gov
   715-460-4503
   920-492-5604

7. Teresa Black
   Teresa.Black@Wisconsin.gov
   715-634-8114
   608-283-7485

8. Brian Nee
   Brian.Nee@Wisconsin.gov
   920-420-4796
   608-221-6935

9. Temporary Coverage
   Joe Merchak@Wisconsin.gov
   715-821-1982
   608-223-7702

10. Joe Merchak
    Joe.Merchak@Wisconsin.gov
        608-235-1000

11. Bret Radke
    Bret.Radke@Wisconsin.gov
        608-236-1301
        608-785-9330

Supervisor – Robin Zenner
Submit general questions to:
Robin.Zenner@Wisconsin.gov
608-266-3723
Bureau Director: Amy Millard  
(608) 266-1816

Supervisor: Scott Mau (608) 261-0342

E-mail firstname.lastname@wisconsin.gov
DYNAMIC DUO
DISTRICT 1: LENNY KANTER
DISTRICT 2: JACK WOTRUBA
UDC PROGRAM ASSIGNMENTS

UDC Consultants:

Jack Wotruba   (920) 360-0020

Lenny Kanter   (608) 261-6541

1 Vacancy
As of January, 2016 Municipalities with:

- State Enforcement = 140
- Municipal Enforcement = 1518
- County Enforcement = 194

There are 12 Counties that provide County wide Enforcement:

- Adams
- Chippewa
- Florence
- Iron
- Marquette
- Trempealeau
- Buffalo
- Eau Claire
- Forest
- Langlade
- Richland
- Waushara
STATE CONTRACTS

- Expired 12/31/2015
- One year extension offered and accepted with 1 change in Taylor County
  - CSC Assessment Services
Municipalities include: Town of Cleveland, Town of Greenwood, Town of Grover, Town of Jump River, Town of Maplehurst, Town of Molitor, Town of Pershing, Town of Roosevelt and Village of Lublin.
RULE MAKING PROCESS
TO SUBMIT AN ITEM FOR CONSIDERATION AT A BOARD OR COUNCIL MEETING
TO SUBMIT AN ITEM FOR CONSIDERATION AT A BOARD OR COUNCIL MEETING
SUBMIT ITEMS FOR CONSIDERATION

Please use this form to submit an item for consideration at a board or council meeting. Please visit our Board and Council Listing page for information on professions regulated by each board. You may be asked to appear at the meeting to present and explain your request. Before submitting your request, please consult your Profession Specific Codebook which will contain the answer to most questions. Please note, neither the Department nor the Boards can respond to the following issues: potential or ongoing litigation, billing, business advice, employer/employee disputes, legal opinions, and questions involving professional judgment or discretion.

Select “Dwelling Code Council” to Submit Codes Items for Consideration
CODE UPDATE PROCESS

- Advisory committee needs to be assembled.
  - Members may need to be from specific group, ie. Inspectors, Contractors, A/E or material suppliers. Goal of a balanced committee of stakeholders.

- Committee review of new standard(s)
  - Typically monthly meetings to review sections and chapters of the standards. Several codes reference multiple standards. IBC has numerous secondary references that need review.

- Statutory rulemaking process 12-18 months.

- Publication and implementation date maybe delayed for seasonal reasons.
RULEMAKING PROCESS
RULE MAKING
PROJECTS
http://dps.wi.gov/Home
There are many laws, rules, and regulations covering the various professions and services for which the Department of Safety and Professional Service (DSPS) has responsibility. These laws, rules, and regulations come from actions of the Legislative and Executive Branches which pass laws that modify Wisconsin Statutes and the Rulemaking process which involves agencies such as DSPS working together with professional boards to develop rules which will carry out requirements set out in Wisconsin Statutes. These rules, when they are developed and finalized, become part of the Wisconsin Administrative Code. More information on each of these topics can be found by following the links below.
THE RULEMAKING PROCESS AT DSPS

The Wisconsin Department of Safety and Professional Services routinely reviews and updates, as needed, the Administrative Rules that relate to the professions, establishments and activities we regulate. Rulemaking involves a number of distinct and important steps.

Active Rulemaking Projects:
A list of active rulemaking projects can be obtained here: http://dps.wi.gov/Boards-Councils/Rulemaking/Pending-Rule-Projects/

Review of existing rules affecting small businesses:
DSPS is currently conducting a comprehensive review of existing rules affecting small business. This review is being conducted in accordance with Governor Walker's Executive Order #61. We are reviewing our existing rules to identify those that hinder small business job creation and small business growth. We will then recommend changes to these rules that will both reduce their burden on job creators while continuing to comply with the intent of the statutes that created them.

Comment on rulemaking projects:
Each rulemaking project has a legally prescribed process for submitting comments. Please consult a specific project for the timetable and methods for submitting comments.

Suggest a rulemaking project:
If there are existing rules that you think should be reviewed and considered for modification, please e-mail at DSPS@wisconsin.gov.
| Safety and Professional Services | SPS 305: Certification to inspect fire detection, prevention, and suppression devices - Emergency Rule | Rule Adopted | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 316: Electrical Code | Scope Published | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 320-325: One and Two Family Dwellings | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 320-325: One and Two Family Dwelling Decks | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 321: Ground Anchors for Manufactured Homes | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 320: Electronic Notifications | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 321: Natural Light in Rooms over Garages | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 322: Crawl Space Ventilation | Legislative Review | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 330: Fire Department Safety and Health Standards | Drafting Rule | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 361-366: Wisconsin Commercial Building Code | Scope Published | Daniel2.Smith@wisconsin.gov |
| Safety and Professional Services | SPS 381-387 and 391: Comprehensive update of the POWTS (private onsite wastewater treatment systems) and Wisconsin Fund | Drafting Rule | Sandy.Cleveland@wisconsin.gov |
RULEMAKING PACKAGES(COMPLETED)

- SPS 305 - Credentialing, Updates for Statute changes.
- SPS 314 - Fire Prevention, adoption of 2012 NFPA 1
- SPS 320-325 Uniform Dwelling Code Updates, Wall Bracing and Deck packages
- SPS 321 Manufactured Homes - Ground Anchors
- SPS 326 - Manufactured Housing, Complete update.
- SPS 332 Public Employee Safety, Update to 2010 OSHA Standards
- SPS 333 Rope and Ski, Update to 2011 ANSI B77.1.
- SPS 341 - Boilers, Update to 2010 ASME
- SPS 384 - Emergency Rule on water treatment devices
RULEMAKING PROJECTS (IN PROGRESS)

- SPS 305 Certification to Inspect Fire Detection, Prevention and Suppression Devices (Emergency Rule in Effect)
- SPS 316 2017 NEC adoption
- SPS 330 Fire Department Health and Safety Update
- SPS 360-366 - Commercial Building Code,
  - Update to 2015 ICC Suite (IBC, IMC, IEBC, IEEC, IFGC)
- SPS 381-387 POWTS and Wisconsin Fund review and update
RULEMAKING PROJECTS (ON DECK)

- SPS 307, 308 Explosives, Fireworks, Mines, Pits and Quarries - Updates
- SPS 320 Electronic Notification of Inspection Results
- SPS 321 Natural Light in Rooms over Garages
- SPS 322 Crawl Space Ventilation
- SPS 327 Camping Units
- SPS 360 Erosion Control, Update Package
- SPS 381-387 and 390 Plumbing, Update
- SPS 390 Swimming Pools
ADDITIONAL RULEMAKING

- Additional rulemaking that DSPS is responsible for includes:
- A/E, Chiropractic, Cosmetology, Dentistry, Medical Examining, Nursing, Optometry, Pharmacy, Psychology, Real Estate and other Boards and Councils.
CODE REVISIONS

- Code revision work is not done by the Division of Industry Services.

- Since October 2011, all DSPS code development is done in the Department’s Division of Policy Development.
Establishes a Uniform Commercial Building Code (UCBC) for the State of Wisconsin, as well as a Building Code Council for the purpose of reviewing the code and making recommendations to the Wisconsin Department of Safety and Professional Services (DSPS) to keep the UCBC current. The previous Commercial Building Code acted as a minimum standard and allowed for municipalities to enact ordinances above and beyond those detailed in the code. The UCBC replaces the previous Commercial Building Code and eliminates municipal variations. However, Act 270 allows for municipalities to submit ordinances to the DSPS within 60 days of publication of the law for review and exemption if the ordinance meets all of the following requirements:

1. The ordinance was enacted before May 1, 2013.
2. The ordinance was published by the town, village, or city in the manner required under Statute 60.80, 61.50, or 62.11(4).
3. The ordinance relates to fire detection, prevention, or suppression components of buildings.
4. The building is not a multifamily dwelling, as defined in Statute 101.971(2).
5. The ordinance is submitted to the department within 60 days after the effective date of this subdivision, Friday, April 18, 2014.
6. The department determines that the ordinance requires standards that are at least as strict as the rules promulgated by the department.
Submitted ordinances were reviewed for compliance with statutory provisions and limitations and determined to either be grandfathered, unenforceable, or outside the scope.

Notification was sent to each municipality that submitted an ordinance indicating the status of the ordinance(s).

DSPS website has been updated with a list of ordinances determined to be enforceable.

Requires fire detection, prevention and suppression devices to be inspected by a certified fire inspector. An emergency rule to implement this requirement has been passed.

Allows 2nd class cities certified by the department to do plan review, to also review petitions for variance.
Established new licensure standards for electricians which went into effect on April 1, 2014. These standards require all individuals (see Act 143 for exemptions) engaged in the business of installing, repairing, and maintaining electrical wiring be licensed by the Wisconsin Department of Safety and Professional Services (DSPS). The new licensure law does not apply to any person with 15 years of experience who was born on or before January 1, 1956.

About a year ago the ‘grandfathering’ provision was amended and individuals meeting the criteria must now submit an application and fee to obtain a certification. Additional exemptions to the licensing requirement were added for well pump installers and for POWTS system installers.

WI State Statute 101.862 - License or registration required.  
http://docs.legis.wisconsin.gov/statutes/statutes/101/IV/862/
ASSEMBLY BILL 571

DSPS required to update Permit form to include:
- A space in which the municipal authority issuing the permit must insert the name of the person to whom the building permit is issued and the number and expiration date of the certificate of financial responsibility issued by DSPS to that person.

Each political subdivision is required to:
- Provide an annual report to the department, on or before January 1, that contains the name of each person to whom the political subdivision issued a building permit for the construction of a one- or 2-family dwelling in the previous year. The report shall include the number and expiration date of each current contractor credential held by that person.
2015 WISCONSIN ACT 211

AN ACT to renumber and amend 101.63 (7); to amend 101.65 (3); and to create 101.63 (7) (b) and 101.63 (7m) of the statutes; relating to: information required on building permit forms, requiring the establishment of an electronic system for building permits, and granting rule-making authority.

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. 101.63 (7) of the statutes is renumbered 101.63 (7) (intro.) and amended to read:

101.63 (7) (Intro.) Prescribe and furnish to municipalities municipal authorities a standard building permit form for all new one- and 2-family dwellings. On or before January 2, 2017, the department shall furnish to municipal authorities the standard building permit form prescribed under this subsection in electronic form. The standard permit form shall include all of the following:

(a) A space in which the municipal authority issuing the permit shall insert the name and license number of the master plumber engaged in supervising the installation of plumbing or installing the plumbing at a new one- or 2-family dwelling.

SECTION 2. 101.63 (7) (b) of the statutes is created to read:

101.63 (7) (b) A space in which the municipal authority issuing the permit shall insert the name of the person to whom the building permit is issued and the number and expiration date of the certificate of financial responsibility issued to that person under s. 101.654.

SECTION 3. 101.63 (7m) of the statutes is created to read:

101.63 (7m) On or before January 2, 2017, establish by rule a system through which a person may electronically submit an application to a municipal authority for a building permit, through which the person may be issued the building permit in electronic form from the municipal authority, and through which the municipal authority may submit copies of issued building permits to the department. The rule shall prescribe a standard building permit application form that shall be furnished to all municipal authorities and used by all applicants for building permits for new one- and 2-family dwellings, except that the department may approve a municipal authority's use of a different application form. The rule shall require a municipal authority to use the standard building permit form prescribed under sub. (7), unless the department approves a municipal authority's use of a different form. A municipal authority shall begin implementation of the system established under this subsection no later than January 2, 2018.

SECTION 3r. 101.65 (3) of the statutes is amended to read:

101.65 (3) Shall use the standard building permit form prescribed and furnished by the department and

(4) Not later than the 15th day of the first month beginning after issuance of each building permit, electronically file a copy of each such the permit issued with the department. If a city, village, town, or county fails to file with the department an electronic copy of an issued permit not later than the last day of the first month beginning after the issuance of the permit, the city, village, town, or county shall refund to the person to whom the building permit was issued an amount equal to the difference between the amount paid by that person to the respective city, village, town, or county for that permit and the portion of the permit fee remitted by the city, village, town, or county to the department, if any. This subsection first applies to a city, village, town, or county beginning on the date the city, village, town, or county begins implementation of the system required under s. 101.63 (7m).
Prescribe and furnish to municipal authorities a standard building permit form for all new one- and 2-family dwellings.

On or before January 2, 2017, the department shall furnish to municipal authorities the standard building permit form prescribed under this subsection in electronic form.
The standard permit form shall include all of the following:

- A space in which the municipal authority issuing the permit shall insert the name and license number of the master plumber engaged in supervising the installation of plumbing or installing the plumbing at a new one- or 2-family dwelling.
- A space in which the municipal authority issuing the permit shall insert the name of the person to whom the building permit is issued and the number and expiration date of the certificate of financial responsibility issued to that person under s. 101.654.
On or before January 2, 2017, establish by rule a system through which a person may electronically submit an application to a municipal authority for a building permit, through which the person may be issued the building permit in electronic form from the municipal authority, and through which the municipal authority may submit copies of issued building permits to the department.
2016 WISCONSIN ACT 211

- The rule shall prescribe a standard building permit application form that shall be furnished to all municipal authorities and used by all applicants for building permits for new one- and 2-family dwellings.
- The rule shall require a municipal authority to use the standard building permit form prescribed under sub. (7), unless the department approves a municipal authority’s use of a different form. A municipal authority shall begin implementation of the system established under this subsection no later than January 2, 2018.
Not later than the 15th day of the first month beginning after issuance of each building permit, electronically file a copy of the permit with the department.
QUESTION???

What happens if a city, village, town, or county fails to file with the department an electronic copy of an issued permit not later than the last day of the first month beginning after the issuance of the permit?
The city, village, town, or county shall refund to the person to whom the building permit was issued an amount equal to the difference between the amount paid by that person to the respective city, village, town, or county for that permit and the portion of the permit fee remitted by the city, village, town, or county to the department, if any.

This subsection first applies to a city, village, town, or county beginning on the date the city, village, town, or county begins implementation of the system required under s. 101.63 (7m).
With the enactment of the 2015-2017 Biennial Budget (2015 WI Act 55), effective July 14, 2015, a waiver from certain UDC code requirements is available to members of established religious sects whose tenets and beliefs prohibit compliance with those requirements and who submit a signed application for a waiver.

The following requirements may be waived:

1) Smoke detectors as required under s. 101.645 (3), Stats., and section SPS 321.09;

2) Carbon monoxide detectors as required under s. 101.647 (3), Stats., and section SPS 321.097; and

3) Any electrical or plumbing code requirement imposed under any provision of chs. 101 or 145, Stats., chs. SPS 324 or SPS 325, or under any ordinance of a political subdivision relating to standards for electrical wiring or plumbing in one- and 2-family dwellings.
A political entity that issues building permits to work on a one- or 2-family dwelling shall issue a waiver upon receipt of a signed and completed application form if all of the following apply:

1) The political entity has no reason to believe the statements provided by the applicant are untrue;

2) The political subdivision is satisfied the waiver will not result in an unreasonable risk to public health or safety; and

3) The waiver specifies those eligible code requirements with which the applicant is not required to comply.
If a political entity finds that one or more conditions for approval are not met, the entity may recommend denial of the waiver. If the municipality recommends denial of the waiver the municipality must submit the application to DSPS along with a description of the reasons for recommending denial. The department will either deny the waiver or issue the waiver to the applicant and notify the political entity of its decision.

- The application form 1000IS is found on the department’s website under the forms tab in the One- and Two-Family Dwellings (Uniform Dwelling Code) Program.
What if, after all of the restrictions are met to comply with the waiver, down the road the property is sold to a person who is not of religious belief? You then would potentially have a home that does not comply with any of these codes and would be unsafe for that person. Can the home be forced to be brought up to current code at that time?
The application for waiver form that they sign states that the waiver holder agrees to modify the dwelling, if necessary, to sell to someone with different beliefs for resale.

It’s not a requirement in the law to have a recorded deed restriction so the municipality cannot require it. The municipality can do it on their own, however.
WEB SITE
APPLICATIONS
ONE-AND TWO-FAMILY UNIFORM DWELLING CODE
The Uniform Dwelling Code (UDC) is the statewide building code for one- and two-family dwellings built since June 1, 1980. The Industry Services Division provides consultation and education concerning UDC construction standards and inspection procedures. Building materials are evaluated for conformance with standards. UDC inspection and contractor credentials are administered. The UDC is enforced in all Wisconsin municipalities.

Building Inspector Association Winter Update Training Presentations

- Inspector Association Winter Update 2016
- Winter Update 2015 True or False
- Wall Bracing Update 2015
- CBRF and Residential DHS Regulatory Model - 2015 Winter Code Updates

**Wisconsin Dwelling Code Council - 2013 Report**

Per 2013 Wisconsin Act 23, the Dwelling Code Council is required to prepare a report detailing its review of and subsequent recommendations to the Wisconsin Uniform Dwelling Code. The Council approved the report by unanimous vote.

Please click here to view the report.

**Highlights of the 2016 Uniform Dwelling Code Changes** (Link)

**WALL BRACING PERMANENT RULES** – download the wall bracing rules and **HOW TO USE guide**

- Wall Bracing Rules
- Wall Bracing Compliance Worksheet
- Wall Bracing FAQ
FREQUENTLY ASKED QUESTIONS

**One- and Two-Family Dwellings (Uniform Dwelling Code) Program**

The Uniform Dwelling Code (UDC) is the statewide building code for one- and two-family dwellings built since June 1, 1980. The Industry Services Division provides consultation and education concerning UDC construction standards and inspection procedures. Building materials are evaluated for conformance with standards. UDC inspection and contractor credentials are administered. The UDC is enforced in all Wisconsin municipalities.

**Building Inspector Association Winter Update Training Presentations**

- [Inspector Association Winter Update 2016](#)
- [Winter Update 2015 True or False](#)
- [Wall Bracing Update 2015](#)
- [CBRF and Residential DHS Regulatory Model - 2015 Winter Code Updates](#)

**Wisconsin Dwelling Code Council - 2013 Report**

Per 2013 Wisconsin Act 23, the Dwelling Code Council is required to prepare a report detailing its review of and subsequent recommendations to the Wisconsin Uniform Dwelling Code. The Council approved the report by unanimous vote.

Please click here to view the report.

[UDC Dwelling Council](#) (Link)
DSPS EMAIL BLASTS

ONLINE SERVICES

- Licensing/Credentialing
- Credential/License Search
- Industry Services (Safety & Buildings)
### TECHNICAL AND FIELD SERVICES ONLINE RESOURCES

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<td>Personal information you provide may be used for secondary purposes. [Privacy Law, s.15.04(l)(m)]</td>
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TECH EMAIL BOXES:

- DSPSSBUdctech@wisconsin.gov
- DSPSSBElectricTech@wisconsin.gov
- DSPSSBPbgTech@wisconsin.gov
INDUSTRY SERVICES UPDATE

Farewells:
- Doug Erler - Holmen, Commercial Building plan reviewer
- Roger Strege - State Building Inspector (Northeast region)
- Duane Hubeler - Madison, UDC Consultant
- Tom Garvey - Electrical Consultant
- Dean Yourchuck - Boiler Inspector
- Jim Pacala - Elevator Inspector
- Scott Amacher - Public Sector Safety Inspector
- Terry Clark - Public Sector Safety Inspector
- Paul Parsons - Public Sector Safety Inspector
- Brian Ferris - Section Chief
- Sharon Blattner-Held - Section Chief
- Brock McHenry - Section Chief
- Paula Veltum - Bureau Director
- Jeff Weigand, Division Administrator
Welcome aboard:

- Joe Monfre - Madison, Commercial Building plan reviewer
- Dave Lintz - Green Bay, Commercial Building plan reviewer
- Larry Wiest - Green Bay, Commercial Building plan reviewer
- Tom Westlund - Hayward, Commercial Building plan reviewer
- Lucas Dederich - State Building Inspector (Northcentral region)
- Bret Radke - State Building Inspector (Southwest region)
- Mike Dubois - Green Bay, Plumbing plan reviewer
- Robert Franke - Waukesha, Plumbing plan reviewer
- Richard Rochelt - Holmen, Plumbing plan reviewer
- Steve Rasmusson - Electrical Inspector (Northwest region)
- Dustin Heacox - Public Sector Safety Inspector
- Kim Schmitt - Section Chief - Elevators, Boilers & Pressure Vessels, Mechanical Refrigeration and Anhydrous Ammonia, Structural Steel Welding
- Amy Millard - Bureau Director, Technical Services
- Scott Mau - Section Chief, UDC and Manufactured Homes, Fire Protection, Electrical
- Kirsten Reader - Division Administrator, Division of Industry Services
Please feel free to submit feedback regarding this presentation at the following link:

https://www.surveymonkey.com/r/industryservices-speaking-event
THANK YOU FOR YOUR TIME
2016 Winter Updates
SPS 320.02(1) New Language
“Group Homes”

SPS 320.02 (1) (ce), (cm), and (cs) are created to read:

SPS 320.02 (1) (ce) A one- or 2-family dwelling built on or after the effective dates under s. SPS 320.03 that is used as a foster home or group home, or as a residential care center for children and youth that has a capacity for 8 or fewer children, all as defined in s. 48.02, Stats. Where such a home or center is operated in each dwelling unit of a 2-family dwelling, the capacity limit for each unit is independent of the other unit only if the two operations are independent of each other.

Refers to Separate Business Ownership
Not Property Ownership
A one- or 2-family dwelling built on or after the effective dates under s. SPS 320.03, in which a public or private day care center for 8 or fewer children is located. Where such a day care center is operated in each dwelling unit of a 2-family dwelling, the capacity limit for each unit is independent of the other unit only if the two operations are independent of each other.

Refers to Separate Business Ownership
Not Property Ownership
(cs) 1. Any portion of or space within a one- or 2-family dwelling built on or after the effective dates under s. SPS 320.03, in which a home occupation is located.

2. In this paragraph, “home occupation” means any business, profession, trade, or employment conducted in a person’s dwelling unit, that may involve the person’s immediate family or household and a maximum of one other unrelated person, but does not involve any of the following:

a. Explosives, fireworks, or repair of motor vehicles.

b. More than 25% of the habitable floor area of the dwelling unit.
SPS 320.07 (36r) and (37m) are created to read:

SPS 320.07 (36r) “Guard” means a barrier erected to prevent a person from falling to a lower level.
(37m) “Handrail” means a horizontal or sloping rail intended for grasping by a hand, for guidance or support or preventing a fall down a stair.
SPS 320.07 (47) is amended to read:

SPS 320.07 (47) “Landing” means the level portion of a stairs located between flights of stairs or located at the top and foot base of a stairs.
(50) “Loft” means an upper room or floor which has at least 50% of the common wall open to the floor below. The opening may be infringed upon by an open guardrail guard constructed in compliance with s. SPS 321.04 (2), but not by a window or half-wall guardrail guard. All habitable rooms of lofts are open to the floor below.
(66) A “stairway” is “Stair,” “stairs,” or “stairway” means one or more flights of steps, risers and the necessary treads, platforms and landings connecting them, to which form a continuous passage from one elevation to another. Multiple stairways can be connected by platforms and landings.
SPS 320.085 is repealed

Notice of Intent Submittals for Erosion Control and Post Construction Stormwater Management

Affected sites with an acre or more of land disturbance

Note in 321.125: Authority for sites of an acre or more of land disturbance transferred to DNR July 2013
SPS 320.09 (5) (b) 2. d. is amended to read:

SPS 320.09 (5) (b) 2. d. The location and construction details of wall bracing on each building side and floor level. The details may consist of the Wall Bracing Compliance Worksheet or a legend showing which wall bracing method is used and the lengths or number of braced wall panels and demarcation of the circumscribed rectangles if more than one is used.
(1) Basic floor plan

Wall Bracing Compliance Worksheet

Complete this worksheet or provide equivalent information on the plans submitted with the permit application.

Sketch and dimension the building plan and the wall bracing rectangle(s) per 321.25(8)(c)1. and Figure 321.25-B. Provide and label additional sketches if the building plan/rectangles change at different floor levels.

Indicate applicable Wall Bracing Method for each level (see Table 321.25-G), each labeled rectangle if more than one [see 321.25(8)(c)], and amount of bracing (# of braced panels or length of braced wall required) per the respective table (provide additional worksheets for additional rectangles as needed):

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls Supporting:</td>
<td>Intermittent method (LIB, DWB, WSP, SFB, GB, PCP) and # of panels per Table 321.25-I</td>
<td>Continuous method (CS-WSP, CS-SFB) and total length required per Table 321.25-J</td>
<td>PF Method (see Figure 321.25-A). Indicate number of PF panels 16-24” wide provided.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Min. panel width (Table 321.25-G) =</td>
<td>Min. panel width (Table 321.25-H) =</td>
<td>Min. PF width (Fig. 321.25-A) =</td>
<td></td>
</tr>
<tr>
<td>Roof and ceiling only</td>
<td>Long side</td>
<td>Short side</td>
<td>Long side</td>
<td>Short side</td>
</tr>
<tr>
<td>One floor, roof and ceiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two floors, roof and ceiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>
SPS 320.09 (5) (d) is repealed.

Post Construction Stormwater Management Plan for sites w/ an acre or more of disturbance. Still required per DNR codes but not in the UDC

No DSPS Authority
SPS 320.09 (6) (d) is amended to read:

SPS 320.09 (6) (d) The name of the initial downstream receiving water of the state from the dwelling shall be identified, regarding erosion and sediment control. and storm water management.
New Concrete Standard Introduced
Table 320.24-1 Is Amended

**NOTE:** Changes To All Adopted Standards

<table>
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<tr>
<th>Standard Reference Number</th>
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<tbody>
<tr>
<td><strong>1. 318-05 318-14</strong></td>
<td>Building Code Requirements for Structural Concrete</td>
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<td><strong>2. 332-14</strong></td>
<td>Residential Code Requirements for Structural Concrete</td>
</tr>
<tr>
<td><strong>23. 530-05 530-13</strong></td>
<td>Building Code Requirements for Masonry Structures</td>
</tr>
<tr>
<td><strong>34. 530.1-05 530.1-13</strong></td>
<td>Specification for Masonry Structures</td>
</tr>
</tbody>
</table>
SPS 321.02 (3) (d) Note: Concrete construction in one- and two-family dwellings should meet the standards established in ACI 318 & 332.

Prescriptive language in UDC still applies: Footings, Foundation, etc.

NOTE: Construction means, materials, or methods not addressed in ACI 332 should meet the standards established in ACI 318.
SPS 321.02 (3) (g) and 2. are consolidated, renumbered SPS 321.02 (3) (g), and amended

SPS 321.02 (3) (g) *Whole logs.* Dwellings constructed of whole logs shall conform to the following standards: 2. ICC/ANSI ICC 400, Standard on the Design and Construction of Log Structures.
(1) EXITS FROM THE FIRST FLOOR. (a) Except as allowed under par. (h), every dwelling unit shall be provided with at least 2 exit doors accessible from the first floor.

**SPS 321.03 (1) (b) Note:** Under this paragraph, only one of the two exit doors that are addressed in par. (a) is required to exit directly to grade.
SPS 321.03 (1) (c) is amended to read:

SPS 321.03 (1) (c)  An additional **Any exit that does not comply with par. (b)** may discharge to an outside balcony that complies with sub. (8).

SPS 321.03 (8)(c) 2.  The floor level of the balcony **shall be no more than 15 feet above the grade below.**
SPS 321.03 (1) (d) is amended to read:

(d) An additional Any exit that does not comply with par. (b) may discharge into an attached garage provided the garage has an exit door that discharges to grade. An overhead garage door may not be used as an exit door.
SPS 321.03 (1) (h) 3. One of the exit doors required in par. (a) may be omitted for a dwelling unit that has one or more egress windows on the first floor. If there are bedrooms, each must have a window that complies with sub. (6).

Sub. (6) Windows Used For Exiting

ie. With an egress window, only one exit door is required from first floor
(a) At least 2 exits shall be provided from the second floor. One **At least one** of the exits shall be a stairway or ramp and lead to the first floor or discharge to grade. The second exit may be via a stairway or ramp which **that** discharges to grade, or may discharge or to a balcony which complies with sub. (8), **or to a deck that complies with s. SPS 321.225 and that is no more than 15 feet above the grade below.***

Balcony – Deck:  Same thing for this purpose
(b) Except as provided in par. (c), windows which comply with sub. (6) may be provided in each second floor bedroom — or in another location on the second floor if there are no bedrooms on that floor — in lieu of the second exit from the that floor.
(C) Where the second floor of a building is the lowest floor level in a dwelling unit, as in an up-and-down duplex, windows may not be provided as the second exit from the floor. No exit from the unit may go through another dwelling unit or other party’s occupancy on the first floor.

One exit door to grade required
Second exit can be a door to a balcony
OR... Egress Window
(d) 5. A Step stair used for the sole purpose of reaching the top of the platform or fixture is exempt from the requirements of s. SPS 321.04.
SPS 321.03 (6)

(e) 4. If the bottom of the areaway is more than 46 inches below adjacent grade or the top of the areaway enclosure, the areaway shall be provided with a ladder or at least one additional step to aid egress. Steps used to comply with this section are exempt from the requirements of s. SPS 321.04.
Ladders or other steps **stairs** used to comply with subd. 4. may infringe on the required area of the areaway by a maximum of 6 inches.
SPS 321.03 (6) (f) and note are created:

321.03(6)(f) An egress window under a deck or porch shall discharge through a clear path of at least 36 inches in height and 36 inches in width, and no more than 15 feet in length, to a yard or open space.
SPS 321.03 (6) (f) and note are created:

Note: Under this paragraph, there is no maximum height above grade for an egress window. Similarly, egress windows are not prohibited from discharging to a roof, **regardless of the slope of the roof**.
SPS 321.03 (7)

(7) (a) 4. Where sliding doors are used as a required exit, the clear opening shall be at least 30 29 inches wide and be at least 76 inches high.
Balconies shall be provided with guardrails in accordance with s. SPS 321.04 (3).

(c) 1. The balcony guardrail shall terminate no more than 46 inches above the floor level of the balcony.

3. The floor of the balcony shall have minimum dimensions of 3 feet by 3 feet. The guardrail and its supports may infringe on the dimensions of the required area no more than 4.5 inches.
SPS 321.03(11) is created to read:

(11) EXITS TO COURTYARDS. No exit may discharge to a courtyard having a perimeter that is entirely enclosed by exterior building walls or other obstructions that prevent pedestrian passage.
(2) (a) 1. Except for spiral staircases under subd. 2., stairways shall measure at least 36 inches in width. Handrails and associated trim may project a maximum of 4.5 inches into the required width at each side of the stairway. **The minimum clear width at and below the handrail, including at treads and landings, may not be less than 31.5 inches where a handrail is installed on one side, and 27 inches where handrails are provided on both sides.**
(2)(c) 4. a. An individual winder tread may be placed between rectangular treads or at the end of a flight of rectangular treads provided the tread depth is at least 9 inches, when measured at a point distance of 12 inches from the narrow end, is equal to the tread depth of the rectangular steps in the flight of the tread or from the inside face of the wall.

b. There may be more than one individual winder tread in a stairway. or in a flight of stairs.
All Winders Must Meet These Reqs.
How About These Apples?
SPS 321.04(3)

(3) HANDRAILS AND GUARDRAILS GUARDS.

(a) 1. Stair flights—**A flight of stairs** with more than 3 risers shall be provided with at least one handrail for the full length of the stair flight.

2. Handrails or guardrails—**Guards** shall be provided on all open sides of stair flights—**stairs** consisting of more than 3 risers and on all open sides of areas that are elevated more than 24 inches above the floor or exterior grade.

**Note:** A handrail provided at 30 to 38 inches above the tread nosing meets the height requirement for a guardrail **guard** on a stairway.
3. a. Except as provided in subd. 3. b., handrails and guardrails shall be constructed to prevent the through-passage of a sphere with a diameter of 4 3/8 inches or larger, when applying a force of 4 pounds.

b. The triangular area formed by the tread, riser and bottom rail shall have an opening size that prevents the through-passage of a sphere with a diameter of 6 inches or larger, when applying a force of 4 pounds.
3. c. Rope, cable, or similar materials used in handrail or guardrail *guard* infill shall be strung with maximum openings of 3½ inches with vertical supports a maximum of 4 feet apart.
4. **a.** Handrails and guardrails—**guards** shall be designed and constructed to withstand a 200 pound load applied in any direction.

**b.** Handrail or guardrail—**guard** infill components, balusters and panel fillers shall withstand a horizontally applied perpendicular load of 50 pounds on any one-foot-square area.

**c.** Glazing used in handrail or guardrail—**guard** assemblies shall be safety glazing.

5. Exterior handrails and guardrails—**guards** shall be constructed of metal, decay resistant or pressure-treated wood, or shall be protected from the weather.
(3) (b) 1. a. Handrails shall be located at least 30 inches, but no more than 38 inches above the nosing of the treads, except as provided in subds. 1. b. to d. Measurement shall be taken from the hard structural surface beneath any finish material to the top of the rail. Variations in uniformity are allowed only when a rail contacts a wall or newel post or where a turnout or volute is provided at the bottom step tread.
What’s a Volute?

Volute Snail

Volute Pumps

Double Volute

Cutwater #1

Single Volute

Cutwater #2

Single Cutwater
Height of Volute

May Exceed 38”

Volute May Protrude Over the Nosing
SPS 321.04 (3) (b)

1. b. A volute, turnout, or starting easing that does not comply with subd. 1. a. may extend over the lowest tread.

c. Transition fittings on handrails may extend above the 38-inch height limit.

d. Where handrail fittings or bendings are used to provide a continuous transition between flights, or at winder treads, or from a handrail to a guard, or at the start of a flight, the height at the fittings or bendings may exceed 38 inches.
Transition Handrails

May Extend Beyond 38” In Height
SPS 321.04 (3) (b) 3.

‘Winders.’ a. Except as provided under subd. 3. b., the required handrail on winder-steps stairs shall be placed on the side where the treads are wider.

b. Where all winder-steps treads in a flight have a tread depth of at least 9 inches (now required) from nosing to nosing measured at a point 12 inches from the narrow end of the tread, the required handrail may be located on either side of the stairway.

(c) Guardrails Guards.

1. a. All openings between floors, and open sides of landings, platforms, balconies or porches that are more than 24 inches above grade or a floor shall be protected with guardrails guards.
1. d. This paragraph does not apply to window wells, egress wells, and retaining walls.

2. ‘Height.’ Guardrails **Guards** shall be located extend to at least 36 inches above the floor or to the underside of a stair handrail complying with s. SPS 321.04 (3) (b). Measurement shall be taken from the hard structural surface beneath any finish material to the top of the rail **guard**.

3. ‘Opening size.’ Guardrails **Guards** shall be constructed to prevent the through-passage of a sphere with a diameter of 4 3/8 inches or larger, when applying a force of 4 pounds.
(a) 2. Intermediate landings that connect 2 or more straight flights of stairs, or 2 flights of stairs at a right angle, shall be at least as wide as the stairway **treads** and shall measure at least 36 inches in the direction of travel.

(b) *Landings at the top and base of stairs.* A level landing shall be provided at the top and base of every stairs **except as provided in par (d).** *(exterior landings)* The landing shall be at least as wide as the stairs **treads** and shall measure at least 3 feet in the direction of travel.
Doors at landings. Except as provided in subds. 1. a. to e. 3. and par. (d), level landings shall be provided on each side of any door located at the top or base of a stairs, regardless of the direction of swing. In the following exceptions, stairways to a stairway between a dwelling and an attached garages, carports or porches are porch is considered to be an interior stairs.
Landing Not Required Where Door Swings In Toward House
Garage Example: Treated as Interior Stair

Note Non Compliant Handrails
3. A landing is not required between a sliding glass door or an in-swinging glass door and the top of an exterior stairway of 3 or fewer risers.
SPS 321.04 (4)

(d) 1. The exterior landing, platform, or sidewalk at an exterior doorway shall be located a maximum of 8 inches below the interior floor elevation, be sloped away from the doorway at a minimal rate that ensures drainage, and shall have a length of at least 36 inches in the direction of travel out of the dwelling.

1:50 Slope

Must Slope Away From Doorway
SPS 321.04 (4)

(d) 2. **Exterior landings.**
The landing at the base of an exterior stair shall be sloped away from the stair at a minimal rate that ensures drainage.

1:50 Slope
(c) 1. Open-sided ramps shall have the area below the handrail protected by intermediate rails or an ornamental pattern to prevent the passage of a sphere with a diameter of 4 3/8 inches or larger when applying a force of 4 pounds, except as provided in subd. 2.
(c) 2. This paragraph does not apply to ramps having a walking surface that is less than 24 inches above adjacent grade, if a toe-kick or side rail is provided to 4 inches above the walking surface, and a mid-rail is provided between the toe-kick or side rail and the handrail.
SPS 321.05

(1) Natural Light (8%) and (2) Ventilation (3.5%)

(1m) NET FLOOR AREA. For the purposes of subs. (1) and (2), “net floor area” does not include any area with a ceiling height of less than 5 feet.
Ceiling Heights to Calculate Net Floor Area

- Ceiling height $\geq 7$ ft.
- DO NOT count ceiling height $< 5$ ft.
- Ceiling height $\geq 5$ ft. and $< 7$ ft. counts toward habitable floor area.

Ceiling Height in Rooms with Sloped Ceilings

© 2010 Dream Home Consultants, LLC.
(a) 2. Any area with a ceiling height of less than 5 feet may be excluded from the net floor area.
SPS 321.05 (3)  
Safety Glazing

(a) Except as provided in par. (e)(b), glazing shall consist of safety glass meeting the requirements of CPSC either 16 CFR, Part 1201 or ANSI Z97.1 when installed in any of the following locations:

(a) In any sidelight or glazing adjacent to a door, that meets all of the following:

1. The nearest point of the glazing is within 2 feet of the door when the door is in the closed position.

5. In guard assemblies. Must Still Withstand 200# Force
5. **In guard assemblies.**
(bm) Safety glass is not required where the size of an individual pane of glass is 8 inches or less in the least dimension. glazing meets any of the following:

1. The size of an individual pane of glass is 8 inches or less in the least dimension.

2. The safety glass is required by sub. (3) (am) 1. and the only door within 2 feet of the glazing is the fixed panel of a patio door.

3. The safety glass is required by sub. (3) (am) 1. and there is an intervening wall or other permanent barrier between the door and the glazing.
(bm) 2. The safety glass is required by sub. (3) and the only door within 2 feet of the glazing is the fixed panel of a patio door.
Ceiling height. All habitable rooms, kitchens, hallways, bathrooms and corridors shall have a ceiling height of at least 7 feet. Habitable rooms, except as follows:

(1)(a) Rooms may have ceiling heights of less than 7 feet provided at least 50% of the room’s floor area has a ceiling height of at least 7 feet. Any area with a ceiling height of less than 5 feet may be ignored in this calculation.

(2) Beams and girders or other projections shall not project more than 8 inches below the required ceiling height.
Ceiling Height
7 Foot Minimum
(1) (b) The 50% limit in par. (a) does not apply to subs. (3) to (6).

(3) The ceiling height extending back from the front edge of a water closet may slope to below 7 feet, but may not go below 5 feet until beyond the back of the water closet.

(4) The ceiling height extending back from the front edge of a lavatory may be less than 7 feet, but may not go below 5 feet until beyond the back of the lavatory.
(3) The ceiling height extending back from the front edge of a water closet may slope to below 7 feet, but may not go below 5 feet until beyond the back of the water closet.
A ceiling height of less than 7 feet may be provided between the rear rim of a bathtub and a wall of the room abutting that rim, or between the side rim and a room wall abutting that rim.

A ceiling height of less than 7 feet may be provided between the rear wall of a shower stall and a wall of the room abutting that rear wall, or between the side wall of a shower and a room wall abutting that side wall.
(5) A ceiling height of less than 7 feet may be provided between the rear rim of a bathtub and a wall of the room abutting that rim, or between the side rim and a room wall abutting that rim.
Note: Section SPS 384.20(5)(o)4. establishes minimum horizontal clearances for water closets, and reads as follows:

“A water closet may not be located closer than 15 inches from its center to any side wall, partition, vanity, or other obstruction, nor closer than 30 inches center to center, between water closets.

There shall be at least 24 inches clearance in front of a water closet to any wall, fixture or door.”
## SPS 321.08 Table 321.08

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<th>Between Dwelling And:</th>
<th>Distance Between Objects</th>
<th>Fire Rated Construction</th>
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<td>Detached garage, or accessory building on same property</td>
<td>Less than 5 feet</td>
<td>3/4-hour wall&lt;sup&gt;3&lt;/sup&gt; 1/3-hour door or window&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Another dwelling on same property</td>
<td>Less than 5 feet</td>
<td>3/4-hour wall&lt;sup&gt;4&lt;/sup&gt; 1/3-hour door or window&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Detached garage, accessory building, or other dwelling on same property</td>
<td>5 to 10 feet</td>
<td>3/4-hour wall&lt;sup&gt;3&lt;/sup&gt; No requirement on openings 1/3-hour door or window&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Detached garage, accessory building, or other dwelling on same property</td>
<td>More than 10 feet</td>
<td>No requirements</td>
</tr>
<tr>
<td>Property Lines</td>
<td>Less than 3 feet</td>
<td>3/4-hour wall 1/3-hour door or window</td>
</tr>
<tr>
<td>Property Lines</td>
<td>3 feet or more</td>
<td>No requirements</td>
</tr>
<tr>
<td>Zero Lot Line</td>
<td>None</td>
<td>Follow sub. (2) (d) requirements</td>
</tr>
</tbody>
</table>

---

<sup>1</sup> Distance shall be measured perpendicular from wall to wall or property line, ignoring overhangs.

<sup>2</sup> Fire rated construction shall protect the dwelling from an exterior fire source.

<sup>3</sup> Fire rated construction shall be in both facing walls.

<sup>4</sup> Fire rated construction may be in either facing wall.

<sup>5</sup> The methods for garage separation in par. (a) 1. are examples of 3/4 hour wall construction.
SPS 321.08 (3) (c)

**Plastic Piping.** Penetrations of a required separation by plastic pipe shall be protected by a penetration firestop system approved by the department and installed as tested in accordance with ASTM E 814 or UL 1479, with a minimum positive pressure differential of 0.01 inch of water (3 pa), and shall have an F rating of not less than the required fire-resistance rating of the assembly penetrated.
SPS 321.09 (2) (a)

Smoke Detectors

Note: Wireless interconnectivity is permitted under this paragraph.

Hardwired with Battery Back-up Still Required
SPS 321.10 (2) (f) 2.
Protection Against Decay and Termites

Siding and sheathing in contact with concrete or masonry and **within 2 inches** above an **impervious surface**.

Less than 2” Height
Requires Treated Lumber
Per AWPA Std or Be Decay Resistant

Impervious Surface refers to surface adjacent to the foundation-structure.
SPS 321.12 (1)
Grade

GRADE. The finished grade of the soil shall slope away from the dwelling at a rate of at least $\frac{1}{2}$ inch per foot for a minimum distance of at least 10 feet, or to the lot line, whichever is less except as provided in subs. (2) and (3).
(2) OTHER SURFACES. Where the finished surface is **impervious**, it shall slope away from the dwelling for at least 10 feet at a rate that ensures **equivalent drainage**.

Approx. 1:50 slope
(3) OBSTRUCTIONS. Where lot lines, walls, slopes, or other barriers prevent having the 10-foot distance in sub. (2), swales or other means shall be provided to ensure equivalent drainage away from the dwelling.
SPS 321.15 (1) (e)
Footings – Isolation Joints

1. Structures supported on floating slabs or similar shallow foundations may not be physically attached to structures that are supported by footings that extend below the frost line unless an isolation joint is used between the structures, except as provided in subd. 2. This isolation shall extend for the full height of the structure.
SPS 321.15 (1) (e)
Isolation Joint Required
(Not New)
Except as per subd. 2
SPS 321.15 (1) (e) 2. Exterior ramps are not required to comply with subd. 1.
Questions?

Lenny Kanter
UDC Engineering Consultant
office (608) 261-6541
cell (608) 225-1855
robert.kanter@wisconsin.gov
2016 Winter Updates
Prescriptive Residential Wood Deck Construction Guide – DCA 6
2012 IRC Version
Free Downloads

- DCA6 Deck Guide

- DCA6 Presentation
Why is this Important?

- **Deck & Porch Injury Study**
  

- Nearly 15% of all deck-related injuries resulted from structural failure

- 60% of structural failures are the deck connection to the house

- 33% are the railing

  “Except for hurricanes and tornadoes, more injuries may be connected to deck failures than all other wood building components and loading cases combined!”

  Dr. Frank Woeste, P.E.
Objectives

- Identify changes to DCA6-2012
- Identify minimum prescriptive wood deck requirements
- Describe minimum material requirements for deck construction including wood members and fasteners
- Discuss design requirements and resources if prescriptive limits are exceeded
- Provide deck design examples
Cooperators

- Prescriptive Residential Wood Deck Construction Guide – Design for Code Acceptance No. 6 (DCA 6)

- **Primary Cooperators**
  - American Wood Council
  - International Code Council
  - Fairfax County, Virginia
Cooperators

- **Additional Cooperators**
  - APA-The Engineered Wood Association
  - National Association of Home Builders
  - Simpson Strong-Tie Company
  - Southern Forest Products Association
  - Southern Pine Inspection Bureau
  - Stairway Manufacturers’ Association
  - Virginia Polytechnic Institute and State University
  - Washington State University
  - NADRA – North American Deck and Railing Association
  - WIJMA – Wood I-Joist Manufacturers Association
Code Basis

- **Basis and Applicability**

  - 2012 International Residential Code (IRC)
  - Bracketed text shows reference to applicable IRC sections ex. [R317 and R318]. **Text in RED font** refers to the Wisconsin Uniform Dwelling Code (UDC)
  - Recommended prescriptive construction methods meet or exceed IRC minimum requirements
  - Provisions not included in IRC are considered good practice recommendations
  - Where differences exist, IRC applies
  - Not intended to preclude use of other construction methods or materials
  - All construction and materials approved by the authority having jurisdiction
Changes to DCA 6-12

- Hold-Downs Tension Devices on all Decks
- Aspect Ratio 1:1
- Post Height based on Tabulated Values
- No Hollow Masonry Connection to Ledger
- 2x6 Joists Added
- I-joist Details for Hold-Down Tension Device
- Overhang Tables
- Glued Laminated Timber Beams Added
- Footing Options Added
- Knee Braces
Objectives

• Identify changes to DCA6-2012
• Identify minimum prescriptive wood deck requirements
• Describe minimum material requirements for deck construction including wood members and fasteners
• Discuss design requirements and resources if prescriptive limits are exceeded
• Provide deck design examples
Minimum Requirements

- Single level residential decks only
- Hot tubs outside scope
- Does not apply for snow loads, snow drift loads, or sliding snow loads that exceed 40 psf
- Decks shall not be used or occupied until final inspection and approval is obtained
- Alternate methods and materials approved by the building official
Minimum Requirements

• **Lumber**
  - American Lumber Standards Committee (ALSC) approved grade mark
  - Naturally durable
    - Redwood or Western Cedar
  - Preservative treated
    - American Wood Protection Association (AWPA)
    - Ground contact

![Table 1. Common Species and Use Categories for Decay Resistance.](image)

Revised in 2012 DCA-6
Deck Design Example 1

- Deck height = 1'-6"
- 8' x 12' deck surface
- Structural members: southern pine
- Decking: 5/4 radius edge southern pine decking
- Determine sizes for joists, beams, hangers, footings, stringers, and treads
- Determine fastener spacing for lag screws in southern pine house band joist
Decking

- Dimension lumber (2” nominal)
- Span rated decking
  - ALSC decking policy
- Attachment
  - 2-8d commons
  - 2-#8 screws
- Spacing 1/8”
- Perpendicular or 45°
- Bear on 3 joists minimum
- Substitution
  - Approved by building official

New to 2012 DCA-6
Minimum Requirements

- **Fasteners**
  - **Nails** — ASTM F 1667
    - Threaded nails as stated in this document include helical (spiral) and annular (ring-shank) nails.
  - **Screws** — ANSI/ASME B18.6.1
  - **Bolts/Lags** — ANSI/ASME B18.2.1
  - ½” bolts and lag screws prescribed extensively
    - Edge distance and spacing based on diameter
    - Need to adjust for larger or smaller fasteners
Minimum Requirements

• Corrosion Resistance 2012 IRC R317.3
  • Screws, bolts, nails
    • Hot-dipped galvanized
    • Stainless
    • Silicon bronze
    • Copper
  • Hangers and anchors
    • Galvanized
    • Stainless
  • Saltwater exposure
    • Stainless
  • Other fasteners/hardware
    • Approved by building official
  • Flashing
    • Nominal 0.019” min.

Also see WI UDC SPS 321.10(5)
Figure 1A: Joist Span – Deck Attached at House and Bearing Over Beam
Figure 2: Joist Span - Non-Ledger Deck

- Optional overhang
- Blocking (at overhanging joists only)
- Rim joist
- Beam (flush tight bearing)
- Post

New to 2012 DCA6

$L_O$ or $L/4$

Maximum overhang

Joist span ($L \leq L_J$)

See Table 2

$L_O$ or $L/4$

Maximum overhang
Figure 1B: Joist Span – Joists Attached at House and to Side of Beam

*Note: beam depth must be equal to or greater than joist depth if joist hangers are used.

See Table 2
Deck Design Example 1

- Joist Size for 8’ span dimension (w/out overhang)
  - DCA 6 Table 2
  - 2x6 @ 16” o.c.

New to 2012 DCA-6

<table>
<thead>
<tr>
<th>Species</th>
<th>Size</th>
<th>12”</th>
<th>16”</th>
<th>24”</th>
<th>12”</th>
<th>16”</th>
<th>24”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Pine</td>
<td>2x6</td>
<td>9’-11”</td>
<td>9’-0”</td>
<td>7’-7”</td>
<td>1’-0”</td>
<td>1’-1”</td>
<td>1’-3”</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>13’-1”</td>
<td>11’-10”</td>
<td>9’-8”</td>
<td>1’-10”</td>
<td>2’-0”</td>
<td>2’-4”</td>
</tr>
<tr>
<td></td>
<td>2x10</td>
<td>16’-2”</td>
<td>14’-0”</td>
<td>11’-5”</td>
<td>3’-1”</td>
<td>3’-5”</td>
<td>2’-10”</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>18’-0”</td>
<td>16’-6”</td>
<td>13’-6”</td>
<td>4’-6”</td>
<td>4’-2”</td>
<td>3’-4”</td>
</tr>
</tbody>
</table>
Joists

• DCA 6 Table 2
  • Allowable overhangs more clearly defined
  • New southern pine design spans

New to 2012 DCA6

Table 2. Maximum Joist Spans and Overhangs

<table>
<thead>
<tr>
<th>Species</th>
<th>Size</th>
<th>Allowable Span² (L_j)</th>
<th>Allowable Overhang³ (L_o)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>12&quot;</td>
<td>16&quot;</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2x6²</td>
<td>9' - 11&quot;</td>
<td>9' - 0&quot;</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>13' - 1&quot;</td>
<td>11' - 10&quot;</td>
</tr>
<tr>
<td></td>
<td>2x10</td>
<td>16' - 2&quot;</td>
<td>14' - 0&quot;</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>18' - 0&quot;</td>
<td>16' - 6&quot;</td>
</tr>
</tbody>
</table>
Joists

- Span table development – without overhangs
  - 40 psf uniform live load
  - 10 psf uniform dead load
  - No. 2 Grade
  - L/360 Deflection Limits
  - Wet Service Condition & Incising
Joists

- Span table development – with overhangs
  - L/180 cantilever deflection limit
  - 220 lb point load at the end of cantilever
- AWC Online Span Calculator
  - Simple spans (no cantilever)
  - Uniform loads
  - Wet service conditions
  - Incising factor
  - 18’-0” MAX (DCA 6)
  - Free at www.awc.org

The Maximum Horizontal Span is:

15 ft. 10 in.

with a minimum bearing length of 0.93 in. required at each end of the member.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Southern Pine</td>
</tr>
<tr>
<td>Grade</td>
<td>No. 2</td>
</tr>
<tr>
<td>Size</td>
<td>2x10</td>
</tr>
<tr>
<td>Modulus of Elasticity (E)</td>
<td>1440000 psi</td>
</tr>
<tr>
<td>Bending Strength (F_b)</td>
<td>1207.5 psi</td>
</tr>
<tr>
<td>Bearing Strength (F_cp)</td>
<td>378.55 psi</td>
</tr>
<tr>
<td>Shear Strength (F_v)</td>
<td>169.75 psi</td>
</tr>
</tbody>
</table>
Joists

- Incising factor
  - Refractory species
  - DFL, HF, SPF
  - Reduces strength and stiffness
## Joists

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Douglas Fir-Larch</td>
</tr>
<tr>
<td>Grade</td>
<td>No. 2</td>
</tr>
<tr>
<td>Size</td>
<td>2x10</td>
</tr>
<tr>
<td>Modulus of Elasticity (E)</td>
<td>1368000 psi</td>
</tr>
<tr>
<td>Bending Strength (Fb)</td>
<td>910.8 psi</td>
</tr>
<tr>
<td>Bearing Strength (Fbq)</td>
<td>418.75 psi</td>
</tr>
<tr>
<td>Shear Strength (Fv)</td>
<td>139.68 psi</td>
</tr>
</tbody>
</table>

The Maximum Horizontal Span is: **13 ft. 11 in.**

with a minimum bearing length of **0.74 in.** required at each end of the member.

Incising factor
2012 IRC

For SI: 1 inch = 25.4 mm.
Ledger Requirements [R507.2.1]

- Ledger board depth \( \geq \) deck joist depth
- Ledger board depth \( \leq \) rim joist depth
- Flashing with drip edge
- Corrosion resistant

Figure 14: General Attachment of Ledger Board to Band Joist or Rim Joist

Also see:
SPS 321.225 – Gen. deck requirements
SPS 321.02 – Design requirements
Ledger Requirements

- Ledger board to foundation wall
  - Concrete or solid masonry
  - ½” approved anchors

Figure 15: Attachment of Ledger Board to Foundation Wall (Concrete or Solid Masonry)

New to 2012 DCA-6

*Note: Blocks filled with grout or concrete at anchor locations for new construction

1/2" diameter approved expansion, epoxy, or adhesive anchors with washers

Embed anchors per manufacturer recommendations

To resist corrosion and decay, this area should be caulked

Existing concrete or solid masonry* wall

2x ledger board; must be greater than or equal to the size of the joist

Deck joist

Joist hanger
Ledger Requirements

- I-joists
  - 1” or thicker EWP rim joist
  - OSB
  - SCL including LVL
  - <1” rim joist
  - Non-ledger deck
  - Full plan submission
- Trusses
  - 2x4 ribbon
    - No deck attachment
  - Requirements
    - Standard details
    - Non-ledger deck
    - Full plan submission
    - SBCA tech note
Prohibited Ledger Attachment

- Exterior veneers
  - Brick
  - Masonry
  - Stone
- Requires non-ledger deck

Figure 17. No Attachment to or Through Exterior Veneers (Brick, Masonry, Stone)

Photo courtesy of John Bouldin. All rights reserved.
Prohibited Ledger Attachment

- Cantilevered floors
- Bay windows
- Requires non-ledger deck

Figure 18. No Attachment to House Overhang
Ledger Board Fasteners

IRC 2012

Also see WI UDC SPS 321.02

<table>
<thead>
<tr>
<th>JOIST SPAN</th>
<th>6' and less</th>
<th>6'1&quot; to 8'</th>
<th>8'1&quot; to 10'</th>
<th>10'1&quot; to 12'</th>
<th>12'1&quot; to 14'</th>
<th>14'1&quot; to 16'</th>
<th>16'1&quot; to 18'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection details</td>
<td>On-center spacing of fasteners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 inch diameter lag screw with 15/32 inch maximum sheathing(a)</td>
<td>30</td>
<td>23</td>
<td>18</td>
<td>15</td>
<td>13</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>1/2 inch diameter bolt with 15/32 inch maximum sheathing</td>
<td>36</td>
<td>36</td>
<td>34</td>
<td>29</td>
<td>24</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers(b, h)</td>
<td>36</td>
<td>36</td>
<td>29</td>
<td>24</td>
<td>21</td>
<td>18</td>
<td>16</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2 inch.

c. Ledgers shall be flashed to prevent water from contacting the house band joist.

d. Lag screws and bolts shall be staggered in accordance with Section R507.2.1.

e. Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.

f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.

g. A minimum 1 x 91/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.

h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.
Deck Ledger Testing

- Virginia Tech & Washington State University
- 3 common conditions
- ½” diameter lag screws & bolts
- Fastener spacing values limited to:
  - Deck LL=40 psf and DL=10 psf
  - Band joist lumber $G \geq 0.42$
  - Composite rim board with thickness $\geq 1"$ and equivalent $G \geq 0.50$
  - PPT deck ledger lumber with $G \geq 0.43$
  - Deck ledger can be incised and wet
  - Proper installation including flashing
  - No decay present
  - No fastener corrosion

Photo courtesy of Frank Woeste and Joseph Loferski. All rights reserved.
### Ledger Fastener Spacing

- **DCA 6 Table 5**
  - $\frac{1}{2}''$ lag screws or bolts
  - Solid sawn or EWP
  - Stacked washer option

#### Table 5. Fastener Spacing for a Southern Pine, Douglas Fir-Larch, or Hem-Fir Deck Ledger or Rim Joist and a 2-inch Nominal Solid-Sawn Spruce-Pine-Fir Band Joist or EWP Rim Board

(Deck Live Load = 40 psf, Deck Dead Load = 10 psf)

<table>
<thead>
<tr>
<th>Joist Span</th>
<th>Rim Board or Band Joist</th>
<th>6'-0'' and less</th>
<th>6' -1'' to 8' -0''</th>
<th>8' -1'' to 10' -0''</th>
<th>10' -1'' to 12' -0''</th>
<th>12' -1'' to 14' -0''</th>
<th>14' -1'' to 16' -0''</th>
<th>16' -1'' to 18' -0''</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connection Details</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\frac{1}{2}''$ diameter lag screw(^1) with $\frac{15}{32}''$ maximum sheathing</td>
<td>1'' EWP</td>
<td>24''</td>
<td>18''</td>
<td>14''</td>
<td>12''</td>
<td>10''</td>
<td>9''</td>
<td>8''</td>
</tr>
<tr>
<td>1'' EWP &amp; 1-1/8'' EWP</td>
<td>28''</td>
<td>21''</td>
<td>16''</td>
<td>14''</td>
<td>12''</td>
<td>10''</td>
<td>9''</td>
<td>8''</td>
</tr>
<tr>
<td>1'' EWP &amp; 1-1/2'' Lumber</td>
<td>30''</td>
<td>23''</td>
<td>18''</td>
<td>15''</td>
<td>13''</td>
<td>11''</td>
<td>10''</td>
<td>9''</td>
</tr>
<tr>
<td>$\frac{1}{2}''$ diameter bolt with $\frac{15}{32}''$ maximum sheathing</td>
<td>1'' EWP</td>
<td>24''</td>
<td>18''</td>
<td>14''</td>
<td>12''</td>
<td>10''</td>
<td>9''</td>
<td>8''</td>
</tr>
<tr>
<td>1'' EWP &amp; 1-1/8'' EWP</td>
<td>28''</td>
<td>21''</td>
<td>16''</td>
<td>14''</td>
<td>12''</td>
<td>10''</td>
<td>9''</td>
<td>8''</td>
</tr>
<tr>
<td>1'' EWP &amp; 1-1/2'' Lumber</td>
<td>36''</td>
<td>34''</td>
<td>29''</td>
<td>24''</td>
<td>21''</td>
<td>19''</td>
<td>18''</td>
<td>16''</td>
</tr>
<tr>
<td>$\frac{1}{2}''$ diameter bolt with $\frac{15}{32}''$ maximum sheathing and $\frac{1}{2}''$ stacked washers(^2,7)</td>
<td>1-1/2'' Lumber</td>
<td>36''</td>
<td>36''</td>
<td>29''</td>
<td>24''</td>
<td>21''</td>
<td>18''</td>
<td>16''</td>
</tr>
</tbody>
</table>
Deck Design Example 1

- **Ledger Fastener Spacing**
  - Assume 2x10 southern pine house rim board
  - Assume 2x8 southern pine ledger
  - DCA 6 Table 5
  - ½" f lag screws @ 23” o.c.

<table>
<thead>
<tr>
<th>Joist Span</th>
<th>Rim Board or Band Joist</th>
<th>6'-0” and less</th>
<th>6'-1” to 8'-0”</th>
<th>8'-1” to 10'-0”</th>
<th>10'-1” to 12'-0”</th>
<th>12'-1” to 14'-0”</th>
<th>14'-1” to 16'-0”</th>
<th>16'-1” to 18'-0”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection Details</td>
<td>On-Center Spacing of Fasteners</td>
<td>1&quot; EWP&lt;sup&gt;6&lt;/sup&gt;</td>
<td>24&quot;</td>
<td>18&quot;</td>
<td>14&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>¼&quot; diameter lag screw with 0.031” maximum sheathing&lt;sup&gt;1&lt;/sup&gt;</td>
<td>1-½&quot; Lumber&lt;sup&gt;7,9&lt;/sup&gt;</td>
<td>28&quot;</td>
<td>21&quot;</td>
<td>16&quot;</td>
<td>14&quot;</td>
<td>12&quot;</td>
<td>10&quot;</td>
<td>9&quot;</td>
</tr>
<tr>
<td>1-½” EWP&lt;sup&gt;6&lt;/sup&gt;</td>
<td>30&quot;</td>
<td>23&quot;</td>
<td>18&quot;</td>
<td>15&quot;</td>
<td>13&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>
Ledger Board Fasteners

IRC 2012

TABLE 507.2.1
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

<table>
<thead>
<tr>
<th></th>
<th>TOP EDGE</th>
<th>BOTTOM EDGE</th>
<th>ENDS</th>
<th>ROW SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ledger</td>
<td>2 inches</td>
<td>¼ inch</td>
<td>2 inches</td>
<td>1 ⁷/₈ inches</td>
</tr>
<tr>
<td>Band Joist</td>
<td>³/₄ inch</td>
<td>2 inches</td>
<td>2 inches</td>
<td>1 ⁷/₈ inches</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).
b. Maximum 5 inches.
c. For engineered rim joists, the manufacturer’s recommendations shall govern.
d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.2.1(1).

*DISTANCE SHALL BE PERMITTED TO BE REDUCED TO 4.5" IF LAG SCREWS ARE USED OR BOLT SPACING IS REDUCED TO THAT OF LAG SCREWS TO ATTACH 2 X 8 LEDGERS TO 2 X 8 BAND JOISTS.

For SI: 1 inch = 25.4 mm.

FIGURE R507.2.1(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS
Ledger Board Fasteners

- **Placement**
  - 2” min. for top row
  - 2” min. from ends
  - Staggered in 2 rows
  - Bottom row depends on ledger depth
  - 5” max. between rows

- **Bolts**
  - ½” diameter with washers

- **Expansion/Adhesive Anchors**
  - ½” diameter with washers
  - Concrete or solid masonry
  - Hollow masonry with grouted cells
  - Embedment length per manufacturer

---

*Distance can be reduced to 4.5” if lag screws are used or bolt spacing is reduced to that of lag screws to attach 2x8 ledgers to 2x8 band joists (1/2” stacked washers not permitted)*
Ledger Board Fasteners

- **Lag Screws**
  - ½” diameter with washers
  - Threads in band board
  - Extend ½” beyond band board

- **Lag Screw Installation**
  - Pilot holes
    - ½” diameter in ledger
    - 5/16” diameter in band board
  - Insert by turning
  - Do not hammer
  - Soap or lubricant
  - Snug but not over-tightened

**Figure 20: Lag Screw Requirements**

![Diagram of lag screw with specifications and instructions]
Deck Lateral

2012 IRC

FLOOR SHEATHING NAILING AT 6 IN. MAXIMUM ON CENTER TO JOIST WITH HOLD-DOWN

HOLD-DOWN OR SIMILAR TENSION DEVICE

FLOOR JOIST

DECK JOIST

For SI: 1 inch = 25.4 mm.

FIGURE 507.2.3
DECK ATTACHMENT FOR LATERAL LOADS

Also see WI UDC SPS 321.02
Deck Lateral

- Attachment to House
  - Lateral attachment to house floor system
  - 2012 IRC
  - 2 locations per deck
  - 1500 lb capacity
  - Always required

New to 2012 DCA-6
Deck Lateral

New to 2012 DCA-6

Figure 23: Lateral Load Device with Joists Perpendicular to Deck Joists

- 6 ft. min. extent of blocking
- Attach blocking to deck w/ 10d nails at 4" o.c. staggered
- Threaded rod, may be sloped up to 1:12 away from the house
- Fasteners per Table 5
- Hold down or similar tension device
- Deck joist
- Full-depth blocking
- Floor joist (l-joist or solid joist)
- Joist hanger, blocking, or reinforcing angle
- Beam & post for non-ledger decks
Rim Joist Requirements

• Decking attachment
  • #10 x 3” min. wood screws @ 6” o.c.
  • 10d threaded nails @ 6” o.c.

• Joist attachment
  • (3) #10 x 3” min. wood screws
  • (3) 10d threaded nails

Figure 11. Rim Joist Connection Details
Joist-to-Beam Connections

- Options
  - Toe-nails
  - Hurricane clip
  - Joist hanger

Figure 6. Joist-to-Beam Detail.

*see manufacturer’s recommendations for additional requirements
Joist-to-Beam Connections

- Joist Hangers
  - Capacity per Table 3A
  - Galvanized
  - No clips/brackets

<table>
<thead>
<tr>
<th>Joist Size</th>
<th>Minimum Capacity, lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x6</td>
<td>400</td>
</tr>
<tr>
<td>2x8</td>
<td>500</td>
</tr>
<tr>
<td>2x10</td>
<td>600</td>
</tr>
<tr>
<td>2x12</td>
<td>700</td>
</tr>
</tbody>
</table>

- Joist Hanger Size
  - DCA 6 Table 3A
  - For 2x6
  - 400 lb joist hanger
Beams

- Spans
  - L/4 maximum overhang
  - Splice over posts
  - Joists cannot be attached to opposite sides of the same beam

Figure 3: Beam Span
Deck Design Example 1

- Beam Size for 12’ span dimension
  - DCA 6 Table 3A
  - For 8’ joist span
  - Try 2-2x8: spans 7’-4”
  - \( L_B/4 = 7' - 4" / 4 = 1' - 10" \)
  - 7’-4” + 1’-10” + 1’-10” = 11’-10” < 12’ **NG**

- Try 3-2x8: spans 9’-3”
  - \( L_B/4 = 9' - 3" / 4 = 2' - 3\frac{3}{4}" \)
  - 9’-3” + 2’-3\frac{3}{4}” + 2’-3\frac{3}{4}” = 13’-10\frac{1}{2}” > 12” **OK**
  - Use 8’ span with 2’ overhangs at each end
  *2-2x10 also works

---

### Table 3A. Dimension Lumber Deck Beam Spans (\( L_B \)) for Joists Framing from One Side Only.

<table>
<thead>
<tr>
<th>Species</th>
<th>Size 4</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Pine</td>
<td>2-2x6</td>
<td>6’ - 8”</td>
<td>5’ - 8”</td>
<td>5’ - 1”</td>
<td>4’ - 7”</td>
<td>4’ - 3”</td>
<td>4’ - 0”</td>
<td>3’ - 9”</td>
</tr>
<tr>
<td></td>
<td>2-2x8</td>
<td>8’ - 6”</td>
<td><strong>7’ - 4”</strong></td>
<td>6’ - 6”</td>
<td>5’ - 11”</td>
<td>5’ - 6”</td>
<td>5’ - 1”</td>
<td>4’ - 9”</td>
</tr>
<tr>
<td></td>
<td>2-2x10</td>
<td>10’ - 1”</td>
<td>8’ - 9”</td>
<td>7’ - 9”</td>
<td>7’ - 1”</td>
<td>6’ - 6”</td>
<td>6’ - 1”</td>
<td>5’ - 9”</td>
</tr>
<tr>
<td></td>
<td>2-2x12</td>
<td>11’ - 11”</td>
<td>10’ - 4”</td>
<td>9’ - 2”</td>
<td>8’ - 4”</td>
<td>7’ - 9”</td>
<td>7’ - 3”</td>
<td>6’ - 9”</td>
</tr>
<tr>
<td></td>
<td>3-2x6</td>
<td>7’ - 11”</td>
<td>7’ - 2”</td>
<td>6’ - 5”</td>
<td>5’ - 10”</td>
<td>5’ - 5”</td>
<td>5’ - 0”</td>
<td>4’ - 9”</td>
</tr>
<tr>
<td></td>
<td>3-2x8</td>
<td>10’ - 7”</td>
<td><strong>9’ - 3”</strong></td>
<td>8’ - 3”</td>
<td>7’ - 6”</td>
<td>6’ - 11”</td>
<td>6’ - 5”</td>
<td>6’ - 1”</td>
</tr>
<tr>
<td></td>
<td>3-2x10</td>
<td>12’ - 9”</td>
<td>11’ - 0”</td>
<td>9’ - 9”</td>
<td>8’ - 9”</td>
<td>8’ - 3”</td>
<td>7’ - 8”</td>
<td>7’ - 3”</td>
</tr>
<tr>
<td></td>
<td>3-2x12</td>
<td>15’ - 0”</td>
<td>13’ - 0”</td>
<td>11’ - 7”</td>
<td>10’ - 6”</td>
<td>9’ - 9”</td>
<td>9’ - 1”</td>
<td>8’ - 7”</td>
</tr>
</tbody>
</table>

*2-2x10 also works*


**Beam Table**

- **Spans limited to 18’ due to footer sizes**

<table>
<thead>
<tr>
<th>Stress Class</th>
<th>Width</th>
<th>Depth</th>
<th>6'</th>
<th>8'</th>
<th>10'</th>
<th>12'</th>
<th>14'</th>
<th>16'</th>
<th>18'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balanced or Unbalanced 20F-1.5E</strong></td>
<td>3-1/2''</td>
<td>9-1/2''</td>
<td>12'-2''</td>
<td>10'-6''</td>
<td>9'-4''</td>
<td>8'-6''</td>
<td>7'-10''</td>
<td>7'-4''</td>
<td>6'-11''</td>
</tr>
<tr>
<td></td>
<td>11-7/8''</td>
<td>15'-2''</td>
<td>13'-1''</td>
<td>11'-8''</td>
<td>10'-8''</td>
<td>9'-10''</td>
<td>9'-2''</td>
<td>8'-8''</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14''</td>
<td>17'-10''</td>
<td>15'-5''</td>
<td>13'-9''</td>
<td>12'-7''</td>
<td>11'-7''</td>
<td>10'-10''</td>
<td>10'-2''</td>
<td></td>
</tr>
</tbody>
</table>

| **Balanced or Unbalanced 20F-1.5E** | 3-1/2'' | 9-1/2'' | 13'-11'' | 12'-1'' | 10'-9'' | 9'-10'' | 9'-1''  | 8'-6''  | 8'-0''  |
|                                   | 11-7/8'' | 17'-5'' | 15'-1'' | 13'-5'' | 12'-3'' | 11'-4'' | 10'-7'' | 10'-0'' |
|                                   | 14''    | 18'-0'' | 17'-9'' | 15'-10'' | 14'-5'' | 13'-4'' | 12'-6'' | 11'-9'' |

| **Balanced 24F-1.1E Douglas Fir-Larch or Southern Pine** | 3-1/2'' | 9-1/2'' | 13'-11'' | 12'-7'' | 11'-8'' | 11'-0'' | 10'-5'' | 9'-11'' | 9'-7''  |
|                                                            | 11-7/8'' | 17'-5'' | 15'-10'' | 14'-8'' | 13'-9'' | 13'-9'' | 12'-6'' | 12'-0'' |
|                                                            | 14''    | 18'-0'' | 17'-4'' | 16'-3'' | 15'-5'' | 14'-9'' | 14'-2'' |

| **Balanced 24F-1.1E Douglas Fir-Larch or Southern Pine** | 3-1/2'' | 9-1/2'' | 13'-11'' | 12'-7'' | 11'-8'' | 11'-0'' | 10'-5'' | 9'-11'' | 9'-7''  |
|                                                            | 11-7/8'' | 17'-5'' | 15'-10'' | 14'-8'' | 13'-9'' | 13'-9'' | 12'-6'' | 12'-0'' |
|                                                            | 14''    | 18'-0'' | 17'-4'' | 16'-3'' | 15'-5'' | 14'-9'' | 14'-2'' |
|                                                            | 16''    | 18'-0'' | 18'-0'' | 18'-0'' | 18'-0'' | 18'-0'' | 18'-0'' | 18'-0'' | 18'-0'' |
Beams

- Assembly
  - For built-up beams
  - 10d threaded or #10 wood screws
  - 16” o.c. staggered

Figure 4. Beam Assembly Details
Post Requirements

- 6x6 or larger
- Centered on footings
- Cut ends field treated
  - Copper naphthenate
  - [R402.1.2]

Also see WI UDC SPS 321.10

Figure 8B: Alternate Approved Post-to-Beam Post Cap Attachment

Solid sawn or multi-ply beam

6x6 min. post
Post Requirements

- Post-to-Beam
  - Notch
    - 3x or 4x beam
    - 2-ply beam
    - Two ½” f bolts w/ washers
  - Post cap
    - 3-ply beams

New to 2012 DCA-6
Post Requirements

- Prohibited connection
  - Beam to side of post
  - Ensures wood-to-wood bearing
  - Avoids potential issues with non-compliant fasteners
  - Bolts in wet service environments have reduced capacity

Figure 9. Prohibited Post-to-Beam Attachment Condition
Footings [R403]

- Depth $\geq 12''$ or frost line
- Soil 1,500 psf bearing capacity

Figure 12: Typical Footing Options

New to 2012 DCA-6
### Footing Sizes and Post Heights

#### New to 2012 DCA-6

**Table 4. Post Height for 6x6 and Footing Sizes for all Posts**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>6'</td>
<td>&lt;10'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>18’</td>
<td>16''x16''</td>
<td>7''</td>
</tr>
<tr>
<td></td>
<td>&lt;14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>21’</td>
<td>18''x18''</td>
<td>8''</td>
</tr>
<tr>
<td></td>
<td>&lt;18'</td>
<td>14'</td>
<td>14'</td>
<td>12'</td>
<td>14'</td>
<td>11’</td>
<td>24’</td>
<td>21''x21’</td>
<td>10''</td>
</tr>
<tr>
<td>8'</td>
<td>&lt;10'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14’</td>
<td>20’</td>
<td>18''x18’</td>
<td>8''</td>
</tr>
<tr>
<td></td>
<td>&lt;14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>11’</td>
<td>24’</td>
<td>21''x21’</td>
<td>10''</td>
</tr>
<tr>
<td></td>
<td>&lt;18'</td>
<td>14'</td>
<td>13'</td>
<td>11’</td>
<td>12’</td>
<td>8’</td>
<td>27’</td>
<td>24''x24’</td>
<td>11''</td>
</tr>
</tbody>
</table>
Deck Design Example 1

- **Footing Size**
  - DCA 6 Table 4
  - Thickness = 8"
  - Square = 18"
  - Round f = 20"
  - Below frost line
  - Post Height = 14’

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td></td>
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<td></td>
</tr>
<tr>
<td>6’</td>
<td>&lt;10’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>18”</td>
<td>16”x16”</td>
<td>7”</td>
</tr>
<tr>
<td></td>
<td>&lt;14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>21”</td>
<td>18”x18”</td>
<td>8”</td>
</tr>
<tr>
<td></td>
<td>&lt;18’</td>
<td>14’</td>
<td>14’</td>
<td>12’</td>
<td>14’</td>
<td>14’</td>
<td>24”</td>
<td>21”x21”</td>
<td>10”</td>
</tr>
<tr>
<td>8’</td>
<td>&lt;10’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>20”</td>
<td>18”x18”</td>
<td>8”</td>
</tr>
<tr>
<td></td>
<td>&lt;14’</td>
<td>14’</td>
<td>14’</td>
<td>14’</td>
<td>11’</td>
<td>14’</td>
<td>24”</td>
<td>21”x21”</td>
<td>10”</td>
</tr>
<tr>
<td></td>
<td>&lt;18’</td>
<td>14’</td>
<td>13’</td>
<td>11’</td>
<td>12’</td>
<td>8’</td>
<td>27”</td>
<td>24”x24”</td>
<td>11”</td>
</tr>
</tbody>
</table>

2. Assumes 1,500 psf soil bearing capacity and 150 pcf concrete. Value may be multiplied by 0.9 for corner posts.

New to 2012 DCA-6
Footing Design

- **DCA 6 Commentary**

Post load: \[ R = 50 \left( \frac{L_J}{2} + \frac{L_J}{4} \right) \left( \frac{L_B}{2} + \frac{L_B}{4} \right) \]

Square footing: \[ B = 12 \sqrt{\frac{R}{1500}} \]

Round footing: \[ D = 12 \sqrt{\frac{4R}{1500\pi}} \]

Footing thickness: \( T \geq P; \quad T = \frac{D - 5.5}{2} \)

Figure C12. Footing dimensions and variables.

New to 2012 DCA-6 – includes concrete dead load
Deck Design Example 1

- **Guard requirements**
  - Deck height < 30”
  - Guard optional

---

**Figure 24. Example Guard Detail**

4x4 post, typical
DO NOT NOTCH

6'-0" maximum spacing
2x6 or 5/4 board
rail cap

2x2 baluster, typical

2x4 top and bottom;
attach to guard post with
(2)8d threaded nails or
(2)#8 wood screws ≥2-1/2"
long on inside face

(2)1/2" diameter
thru-bolts and
washers

openings shall not allow
the passage of a 4"
diameter sphere

attach balusters at top and bottom
with (1)#8 wood screw or (2)8d
post-frame threaded nails with
0.135" nominal diameter
Deck Design Ex. #1 - Framing Plan

Southern Pine

Lumber species:

Chimney or Bay Window

(see Table 1)

2' ledger board with 1/2" dia. bolts/lag screws/anchors @ 25" o.c.

(see Table 5)

Joist hanger: __ lbs

(see Table 3A)

Trimmer hanger: N/A lbs

(see Table 7)

Rim joist

Stair stringers:
cut or solid
span: __"__"

(see Figure 28)

Treads: __ x __

(see Table 6)

Overall deck width: __"__"
Typical Framing Plan

New to 2012 DCA 6: W>L
Deck Design Example 2

- Deck height = 8'-0"
- 16' x 20' deck surface
- Structural members: southern pine
  - Glued Laminated Timber Beam
- Decking: 5/4 radius edge southern pine decking
- Framing around a 5’ wide by 2½’ deep bay window
- Determine sizes for joists, beams, hangers, footings, stringers, and treads
- Determine fastener spacing for bolts in 1-1/8” EWP house rim joist
Deck Design Example 2

- Joist Size for 16’ span dimension (w/ overhang)
  - DCA 6 Table 2
  - 2x10 @ 16” o.c. w/ 2’-0” overhang

<table>
<thead>
<tr>
<th>Species</th>
<th>Size</th>
<th>Allowable Span² (LJ)</th>
<th>Allowable Overhang³ (L₀)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>12”</td>
<td>16”</td>
</tr>
<tr>
<td>Southern Pine</td>
<td>2x6</td>
<td>9’-11”</td>
<td>9’-0”</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>13’-1”</td>
<td>11’-10”</td>
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<td></td>
<td>2x10</td>
<td>16’-2”</td>
<td><strong>14’-0”</strong></td>
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<tr>
<td></td>
<td>2x12</td>
<td>18’-0”</td>
<td>16’-6”</td>
</tr>
</tbody>
</table>
## Deck Design Example 2

- **Beam Size for 14’ span dimension**
- **DCA 6 Table 3B for 14’ joist span**
- **14’-0 + (2) 3’-0” overhangs = 20’**

### Table 3B. Glued Laminated Timber Beam Spans (L_b)¹ for Joists Framing from One Side Only.

<table>
<thead>
<tr>
<th>Stress Class²</th>
<th>Width³</th>
<th>Depth⁴</th>
<th>6’</th>
<th>8’</th>
<th>10’</th>
<th>12’</th>
<th>14’</th>
<th>16’</th>
<th>18’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanced or Unbalanced 20F-1.5E And Higher Grade Cedar</td>
<td>3-1/2”</td>
<td>9-1/2”</td>
<td>12’-2”</td>
<td>10’-6”</td>
<td>9’-4”</td>
<td>8’-6”</td>
<td>7’-10”</td>
<td>7’-4”</td>
<td>6’-11”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-7/8”</td>
<td>15’-2”</td>
<td>13’-1”</td>
<td>11’-8”</td>
<td>10’-8”</td>
<td>9’-10”</td>
<td>9’-2”</td>
<td>8’-8”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14”</td>
<td>17’-10”</td>
<td>15’-5”</td>
<td>13’-9”</td>
<td>12’-7”</td>
<td>11’-7”</td>
<td>10’-10”</td>
<td>10’-2”</td>
</tr>
<tr>
<td></td>
<td>5-1/4”</td>
<td>11-7/8”</td>
<td>18-0”⁵</td>
<td>16-8”</td>
<td>14-10”</td>
<td>13’-7”</td>
<td>12’-6”</td>
<td>11’-8”</td>
<td>11’-0”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14”</td>
<td>18-0”⁵</td>
<td>18-0”⁵</td>
<td>17-6”</td>
<td>15-11”</td>
<td>14-9”</td>
<td>13-9”</td>
<td>13-0”</td>
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<tr>
<td></td>
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<td>16”</td>
<td>18-0”⁵</td>
<td>18-0”⁵</td>
<td>18-0”⁵</td>
<td>18-0”⁵</td>
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<tr>
<td>Unbalanced 24F-1.8E Douglas Fir-Larch or Southern Pine</td>
<td>3-1/2”</td>
<td>9-1/2”</td>
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<td>10-9”</td>
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<td>8-0”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-7/8”</td>
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<td>15-1”</td>
<td>13-5”</td>
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<td>11-4”</td>
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<td>Balanced 24F-1.8E Douglas Fir-Larch or Southern Pine</td>
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<td>18-0”⁵</td>
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<td>18-0”⁵</td>
<td>18-0”⁵</td>
<td>18-0”⁵</td>
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</tbody>
</table>
### Deck Design Example 2

- **Footing Size**
  - DCA 6 Table 4
  - Thickness = 14”
  - Square = 29”
  - Round f = 32”
  - Below frost line
  - Post Height = 11’

#### Table 4. Post Height for 6x6 and Footing Sizes for all Posts

<table>
<thead>
<tr>
<th>Beam Span, $L_B$</th>
<th>Joist Span Lj</th>
<th>Southern Pine</th>
<th>Douglas Fir-Larch³</th>
<th>Hem-Fir² Western Cedars</th>
<th>Redwood</th>
<th>Ponderosa Pine, Red Pine, SPF³</th>
<th>Round Footing Diameter</th>
<th>Square Footing</th>
<th>Footing Thickness¹</th>
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<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>18'</td>
<td>16”x16”</td>
<td>7”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;14’</td>
<td>14’</td>
<td>14'</td>
<td>14'</td>
<td>14'</td>
<td>21”</td>
<td>18”x18”</td>
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<tr>
<td></td>
<td>&lt;18’</td>
<td>14’</td>
<td>12’</td>
<td>14’</td>
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<td>14’</td>
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<td>11’</td>
<td>8’</td>
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<td>34”</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>&lt;14’</td>
<td>11’</td>
<td>10’</td>
<td>7’</td>
<td>10’</td>
<td>2’</td>
<td>29”x29”</td>
<td>14”</td>
<td></td>
</tr>
<tr>
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<td>8’</td>
<td>2’</td>
<td>8’</td>
<td>NP</td>
<td>37”</td>
<td>16”</td>
<td></td>
</tr>
</tbody>
</table>
Framing at Chimney or Bay Window

- Headers 6’ maximum span
  - Use 6x6 post to reduce spans to ≤6’
  - >6’ span requires plan submission

Figure 35: Detail for Framing Around a Chimney or Bay Window

- Trimmer joist may be double if joists are spaced 24” o.c. or if trimmer length is 8’-6” or less

*See Figure 19 for fastener spacing, edge, and end distances*
Framing at Chimney or Bay Window

- Trimmers
  - Triple
    - 12"-16" joist spacing
    - Spans > 8'-6"
  - Double
    - 24" joist spacing
    - Spans ≤ 8'-6"
  - “a” ≤ 3'

<table>
<thead>
<tr>
<th>Joist Size</th>
<th>Minimum Capacity, lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x6</td>
<td>870</td>
</tr>
<tr>
<td>2x8</td>
<td>1155</td>
</tr>
<tr>
<td>2x10</td>
<td>1420</td>
</tr>
<tr>
<td>2x12</td>
<td>1575</td>
</tr>
</tbody>
</table>
Deck Design Example 2

- **Bay Window**
  - Header = 6’
  - a = 2’-6”
  - Triple trimmer joist
  - Trimmer hanger = 1,420 lbs

<table>
<thead>
<tr>
<th>Joist Size</th>
<th>Minimum Capacity, lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x6</td>
<td>870</td>
</tr>
<tr>
<td>2x8</td>
<td>1155</td>
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<tr>
<td>2x10</td>
<td>1420</td>
</tr>
<tr>
<td>2x12</td>
<td>1575</td>
</tr>
</tbody>
</table>

Figure 35: Detail for Framing Around a Chimney or Bay Window

*Trimmer joist may be double if joists are spaced 24” o.c. or if trimmer length is 8’-6” or less

*See Figure 19 for fastener spacing, edge, and end distances
Knee Braces

- Decks > 2’ above grade
  - require diagonal bracing

- Parallel to beam
  - Lag Screw to beam and post
  - Perpendicular to beam
  - Bracing not required

Figure 10: Diagonal Bracing

New to 2012 DCA-6
Guard Requirements

- Adjacent Fixed Seating Requirement
- 36” measurement from seat

- R312.2 Height. Required *guards* at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads.
Guard Requirements

- **Guard requirements**
  - Deck height > 30”
  - Guard Required

**Figure 24. Example Guard Detail**

- 4x4 post, typical
- DO NOT NOTCH
- 6'-0” maximum spacing
- 2x6 or 5/4 board rail cap
- 2x2 baluster, typical
- 2x4 top and bottom; attach to guard post with (2)8d threaded nails or (2)#8 wood screws ≥2-1/2” long on inside face
- (2)1/2” diameter thru-bolts and washers
- Openings shall not allow the passage of a 4” diameter sphere
- Attach balusters at top and bottom with (1)#8 wood screw or (2)8d post-frame threaded nails with 0.135” nominal diameter
Guard Post Testing

• IBC/IRC require guard rails to resist 200 lb concentrated load. See WI UDC SPS 321.04(3)(a)4.a.

• Tests require 2.5 safety factor per IBC

• Virginia Tech Research
  • Typical ½” bolt or lag screw connections failed
  • Commercial hold down passed

Photo courtesy of Frank Woeste and Joseph Loferski. All rights reserved.
Guard Requirements

- Minimum 4x4 post
- Bending design value $\geq$ 1,100 psi
  - All No.2 species shown in Table 2
  - $C_M = 0.85$, $C_i = 0.80$, $C_D = 1.6$

Figure 25. Guard Post to Outside Joist Example

- Guard posts may be located on either side of the outside-joist
- At first interior bay, provide 2x blocking at guard posts with hold-down anchors; attach blocking with 10d threaded nails top and bottom, each side
- Guard posts can be installed as shown in Figure 26 (between joists) if blocking is installed as shown below within 12" of each side of the post
Guard Requirements

- Guard Post to Rim Joist
  - Hold down anchors
  - Minimum of two ½” bolts

Figure 26. Guard Post to Rim Joist Example
Stair Requirements

- Treads and Risers
  - 7-3/4” rise & 10” run [See WI UDC SPS 321.04 - 8” rise and 9” run in Wisconsin]
  - Except where amended
  - 1x risers
  - Treads per Table 6
  - Openings < 4” diameter sphere
Stair Requirements

- Stringers
  - Minimum 2x12
  - Spans per Figure 28
  - Intermediate landings permitted
Deck Design Example 2

- **Stair Stringers**
  - DCA 6 Figure 28
  - 8’ deck height
  - Requires 10’-4” solid stringer span assuming 7¾” rise and 10” run 13’-3” > 10’-4” ok
  - Use a Solid stringer
Stair Requirements

- Stringer Attachment
  - Hangers
    - Sloped joist hanger
  - Per manufacturer

**Figure 31. Stair Stringer Attachment Detail**

ATTACHMENT WITH HANGERS
Stair Footings [R403] [SPS 321.15]

- Lighting
- Top landing
- Illuminate all landings
- Light switch inside the house
Stair Requirements

- **Stringers**
  - Cut \( \leq 18'' \) o.c.
  - Solid \( \leq 36'' \) o.c.

- **Treads**
  - Sizes per Table 6
  - Connections per Fig 29
Deck Design Example 2

- **Stair Treads**
  - DCA 6 Table 6
  - Solid Stringer
  - 2x8 southern pine treads

---

**Table 6: Minimum Tread Size for Cut and Solid Stringers**

<table>
<thead>
<tr>
<th>Species</th>
<th>Cut Stringer</th>
<th>Solid Stringer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Pine</td>
<td>2x4 or 5/4</td>
<td>2x8</td>
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<tr>
<td>Douglas Fir Larch, Hem-Fir, SPF³</td>
<td>2x4 or 5/4</td>
<td>2x8 or 3x4</td>
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<tr>
<td>Redwood, Western Cedars, Ponderosa Pine³, Red Pine³</td>
<td>2x4 or 5/4</td>
<td>2x10 or 3x4</td>
</tr>
</tbody>
</table>

---

**Figure 29: Tread Connection Requirements**

Attachment per tread at each stringer or ledger:
- 2x_ or 5/4 treads - (2)8d common nails or (2)#8 screws ≥2-1/2" long
- 3x_ treads - (2)16d common nails or (2)#8 screws ≥3-1/2" long

---

CUT STRINGER

SOLID STRINGER

2x4 ledgers, each side, full depth of tread: attach with (4)10d common nails or (4)#8 wood screws ≥3" long
Deck Design Ex. #2 - Framing Plan

Figure 5. Typical Deck Framing Plan

Lumber species: **Southern Pine** (see Table 1)

1-1/8” house rim
2” x 10” ledger board with 1/2” dia.
bolts/lag screws/anchors @ 12” on center
(see Table 5)

joist hanger: **600** lbs
(see Table 3A)

trimmer hanger: **1420** lbs
(see Table 7)

rim joist

stair stringers:
cut or solid
span: **10' - 4"**
(see Figure 28)

treads: **2” x 8”**
(see Table 6)
Stair Requirements

- Handrails
  - Required for stairs with 4 or more treads
  - Height 34” – 38”

Figure 32A. Handrail Mounting Examples
Stair Requirements

• Handrails
  • Type I: 4" – 6¼" perimeter
    • Circular
      • 1¼" – 2" diameter
    • Noncircular
      • Max. cross section 2¼"
  • Type II: >6¼" perimeter
    • Graspable recess

Figure 32B. Handrail Grip Size

NONCIRCULAR
[Circular]
Perimeter: 4" - 6¼"

CIRCULAR

RECESSED
[Recessed]
Perimeter: >6¼"
Stair Requirements

- Handrails
  - Continuous from lowest to highest riser
  - Return to guard at each end
  - May be interrupted by guard at turn
  - Height 30” to 38” in Wisconsin
DCA 6 Commentary

- Background information
- Example calculations
- Alternate prescriptive provisions
  - Ex: Joists framing into 2 sides of the same beam
  - 8′-0″ joists from opposite sides
  - Use 16′-0″ joist spans for equivalent tributary area

<table>
<thead>
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<th>Species</th>
<th>2-2x6</th>
<th>2-2x8</th>
<th>2-2x10</th>
<th>2-2x12</th>
<th>Southern Pine</th>
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<td>8′-6″</td>
<td>10′-1″</td>
<td>11′-1″</td>
<td>7′-11″</td>
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<tr>
<td>8′</td>
<td>5′-8″</td>
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<td>7′-9″</td>
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Table 3A. Dimension Lumber Deck Beam Spans \( (L_B) \) for Joists Framing from One Side Only.
Objectives/Outline

- Identify minimum prescriptive wood deck requirements
- Describe minimum material requirements for deck construction including wood members and fasteners
- Discuss design requirements and resources if prescriptive limits are exceeded
- Provide a deck design example
Additional Resources

- **2015 National Design Specification® (NDS®) for Wood Construction**
  - Structural lumber
    - Design values
  - Column design
  - Beam design
  - Connection design
- **Footing design**
  - Per engineering mechanics
Design Values

- **Structural Lumber Classifications**
- **Dimension Lumber**
  - Rectangular or square cross-section
  - 2" - 4" thick and 2" or more wide
- **Beams and Stringers**
  - Rectangular cross-section
  - 6" x 8" and larger
  - Graded for strength in bending on narrow face
- **Posts and Timbers**
  - Square or nearly square cross-section
  - 5" x 5" and larger
  - Graded for use as posts
## Design Values

- Design values are assigned to predict strength and stiffness properties to meet engineering design requirements.

### Table 4A (Cont.) Reference Design Values for Visually Graded Dimension Lumber (2" - 4" thick)$^{1,2,3}$

(All species except Southern Pine—see Table 4B) (Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

#### USE WITH TABLE 4A ADJUSTMENT FACTORS

<table>
<thead>
<tr>
<th>Species and commercial grade</th>
<th>Size classification</th>
<th>Design values in pounds per square inch (psi)</th>
<th>Modulus of Elasticity</th>
<th>Specific Gravity$^+$</th>
<th>Grading Rules Agency</th>
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<tr>
<td></td>
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<td>Bending $F_b$</td>
<td>Tension parallel to grain $F_t$</td>
<td>Shear parallel to grain $F_v$</td>
<td>Compression perpendicular to grain $F_{c\perp}$</td>
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<td><strong>REDWOOD</strong></td>
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<td>$F_b$</td>
<td>$F_t$</td>
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<td>$F_{c\perp}$</td>
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<td></td>
<td>925</td>
<td>525</td>
<td>160</td>
<td>650</td>
</tr>
<tr>
<td>No. 2, open grain</td>
<td></td>
<td>725</td>
<td>425</td>
<td>160</td>
<td>425</td>
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<tr>
<td>No. 3</td>
<td></td>
<td>525</td>
<td>300</td>
<td>160</td>
<td>650</td>
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<tr>
<td>No. 3, open grain</td>
<td></td>
<td>425</td>
<td>250</td>
<td>160</td>
<td>425</td>
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<tr>
<td>Stud</td>
<td>2&quot; &amp; wider</td>
<td>575</td>
<td>325</td>
<td>160</td>
<td>425</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td>825</td>
<td>475</td>
<td>160</td>
<td>425</td>
</tr>
<tr>
<td>Standard</td>
<td>2&quot; - 4&quot; wide</td>
<td>450</td>
<td>275</td>
<td>160</td>
<td>425</td>
</tr>
<tr>
<td>Utility</td>
<td></td>
<td>225</td>
<td>125</td>
<td>160</td>
<td>425</td>
</tr>
</tbody>
</table>
Design Properties - Bending

Fiber Stress in Bending $F_b$
Design Properties - Compression

Compression Parallel to Grain

\[ F_{c||} \]
Lumber Adjustment Factors

**Most common adjustment factors for decks**

<table>
<thead>
<tr>
<th>Load Duration Factor</th>
<th>Wet Service Factor</th>
<th>Temperature Factor</th>
<th>Beam Stability Factor</th>
<th>Size Factor</th>
<th>Flat Use Factor</th>
<th>Inelastic Factor</th>
<th>Repetitive Member Factor</th>
<th>Column Stability Factor</th>
<th>Backing Stiffness Factor</th>
<th>Bearing Area Factor</th>
<th>LRFD only</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_b' = F_b$</td>
<td>$C_D$</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$C_L$</td>
<td>$C_F$</td>
<td>$C_{fu}$</td>
<td>$C_i$</td>
<td>$C_r$</td>
<td></td>
<td></td>
<td>$2.54$</td>
</tr>
<tr>
<td>$F_t' = F_t$</td>
<td>$C_D$</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- C_F$</td>
<td>$- C_i$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>$2.70$</td>
</tr>
<tr>
<td>$F_v' = F_v$</td>
<td>$C_D$</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- - C_i$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>$2.88$</td>
</tr>
<tr>
<td>$F_{e1}' = F_{e1}$</td>
<td>$C_D$</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- C_F$</td>
<td>$- C_i$</td>
<td>-</td>
<td>$C_P$</td>
<td>-</td>
<td></td>
<td></td>
<td>$2.40$</td>
</tr>
<tr>
<td>$F_{e2}' = F_{e2}$</td>
<td>-</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- - C_i$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>$1.67$</td>
</tr>
<tr>
<td>$E' = E$</td>
<td>-</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- - C_i$</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>$E_{\min}' = E_{\min}$</td>
<td>-</td>
<td>$C_M$</td>
<td>$C_t$</td>
<td>$- - C_i$</td>
<td>-</td>
<td>-</td>
<td>$C_T$</td>
<td>-</td>
<td></td>
<td></td>
<td>$1.76$</td>
</tr>
</tbody>
</table>

**Beams/Joists**

**Columns**
Load Duration Factors

Assumption for decks is occupancy live load

<table>
<thead>
<tr>
<th>Load Duration</th>
<th>$C_D$</th>
<th>Typical Design Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent</td>
<td>0.9</td>
<td>Dead Load</td>
</tr>
<tr>
<td>Ten years</td>
<td>1.0</td>
<td>Occupancy Live Load</td>
</tr>
<tr>
<td>Two months</td>
<td>1.15</td>
<td>Snow Load</td>
</tr>
<tr>
<td>Seven days</td>
<td>1.25</td>
<td>Construction Load</td>
</tr>
<tr>
<td>Ten minutes</td>
<td>1.6</td>
<td>Wind/Earthquake Load</td>
</tr>
<tr>
<td>Impact</td>
<td>2.0</td>
<td>Impact Load</td>
</tr>
</tbody>
</table>

1. Load duration factors shall not apply to reference modulus of elasticity, $E$, reference modulus of elasticity for beam and column stability, $E_{min}$, nor to reference compression perpendicular to grain design values, $F_{c\perp}$, based on a deformation limit.

2. Load duration factors greater than 1.6 shall not apply to structural members pressure-treated with water-borne preservatives (see Reference 30), or fire retardant chemicals. The impact load duration factor shall not apply to connections.
Figure B1 — Load Duration Factors, for Various Load Durations
## Size Adjustment Factor

Common for joists/beams

<table>
<thead>
<tr>
<th>Grades</th>
<th>Width (depth)</th>
<th>$F_b$</th>
<th>$F_t$</th>
<th>$F_c$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thickness (breadth)</td>
<td>2&quot; &amp; 3&quot;</td>
<td>4&quot;</td>
<td></td>
</tr>
<tr>
<td>Select</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>5&quot;</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>6&quot;</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>8&quot;</td>
<td>1.2</td>
<td>1.3</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>10&quot;</td>
<td>1.1</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>12&quot;</td>
<td>1.0</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>14&quot; &amp; wider</td>
<td>0.9</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Structural,</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>5&quot; &amp; 6&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>8&quot; &amp; wider</td>
<td>Use No.3 Grade tabulated design values and size factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.1 &amp; Btr,</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>No.1, No.2,</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>No.3</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>2&quot; &amp; 3&quot;</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Construction, Standard</td>
<td>2&quot;, 3&quot;, &amp; 4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Utility</td>
<td>4&quot;</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>2&quot; &amp; 3&quot;</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Repetitive Member Factor, $Cr$

- 2"- 4" dimension lumber
- 24" o.c. or less
- 3 or more members
- Load distributing element
- Applies to $F_b$

- For decks
  - Joists
  - Built-up beams

$Cr = 1.15$
Wet Service Factor, $C_M$

<table>
<thead>
<tr>
<th>$F_b$</th>
<th>$F_t$</th>
<th>$F_v$</th>
<th>$F_{c\perp}$</th>
<th>$F_c$</th>
<th>$E$ and $E_{\text{min}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.85*</td>
<td>1.0</td>
<td>0.97</td>
<td>0.67</td>
<td>0.8**</td>
<td>0.9</td>
</tr>
</tbody>
</table>

* when $(F_b)(C_F) \leq 1,150$ psi, $C_M = 1.0$
** when $(F_c)(C_F) \leq 750$ psi, $C_M = 1.0$

Note the adjustment is unity if:

\[ F_b C_F \leq 1150 \text{ psi} \]
Incising Factor, Ci

- Sawn Lumber - Refractory Species
- Increase Preservative Penetration
- 0.4" Depth
- 3/8" Length
- 1100 teeth / ft² density
# Incising Factor, $C_i$

## Table 4.3.8 Incising Factors, $C_i$

<table>
<thead>
<tr>
<th>Design Value</th>
<th>$C_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$E$, $E_{\text{min}}$</td>
<td>0.95</td>
</tr>
<tr>
<td>$F_b$, $F_t$, $F_c$, $F_v$</td>
<td>0.80</td>
</tr>
<tr>
<td>$F_{c\perp}$</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Adjustment Factors - Example

- No. 2 grade, 2x8 Hem Fir deck joist, 16" o.c., incised, wet use, tabulated Fb = 850 psi
  - CF = 1.2
  - CM = 1.0
  - Ci = 0.80
  - Cr = 1.15
- Allowable Fb' is:
  - \( 850 \times 1.2 \times 1.0 \times 0.80 \times 1.15 = 938 \text{ psi} \)
- Used to calculate joist spans
Span Tables for Joists and Rafters

- Floors, ceilings, rafters
- Loads
  - Dead loads - 5, 10, & 20 psf
  - Live loads - 20, 30, 40, 50, & 60 psf
- Deflection criteria
  - L/180, L/240, & L/360
  - Adjustment factors for L/480 & L/600
- Design value adjustments
  - Size factor
  - Repetitive member
  - Load duration
  - Wet service
  - Incising
- Free at www.awc.org
- Span table tutorial
  www.awc.org/technical/spantables/tutorial.php
Span Calculator

- AWC Online Span Calculator – www.awc.org
- Simple spans (no cantilever)
- Uniform loads
- Wet service conditions
- Incising factor

**The Maximum Horizontal Span is:**

**14 ft. 0 in.**

with a minimum bearing length of 0.82 in. required at each end of the member.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species</td>
<td>Southern Pine</td>
</tr>
<tr>
<td>Grade</td>
<td>No. 2 (Eff. 6/1/13)</td>
</tr>
<tr>
<td>Size</td>
<td>2x10</td>
</tr>
<tr>
<td>Modulus of Elasticity (E)</td>
<td>1260000 psi</td>
</tr>
<tr>
<td>Bending Strength (F_b)</td>
<td>920 psi</td>
</tr>
<tr>
<td>Bearing Strength (F_cp)</td>
<td>378.55 psi</td>
</tr>
<tr>
<td>Shear Strength (F_v)</td>
<td>169.75 psi</td>
</tr>
</tbody>
</table>
Column Design

• Columns and posts must be designed for stability and load carrying capacity
  • Tributary area
  • Floor/deck load
  • Column or post length (height)

• Design of solid columns with unbraced lengths in either the strong or weak axis requires buckling analysis in accordance with NDS 3.7
Post Height for DCA 6

- **6x6 minimum**
- **8x8 Alternate**
  - DCA 6 Commentary
  - **14' max. height**
Beam/Joist Design

- Beam/Joist Spans are based on
  - Species and grade of lumber
  - Cross-sectional size of beam
  - Tributary load it supports

- Design Considerations
  - Bending
  - Shear
  - Deflection
  - Bearing
Joist/Beam Design - Notches

- Notching Provisions – Sawn Lumber
  - NDS 3.2.3 & R502.8 [SPS 320 & 321.22(5)]
Column and Beam Design

• Tables simplify process
• Wood Structural Design Data (WSDD)
  • Column load tables
  • Beam load tables
  • Requires adjusted design values
• Free at www.awc.org
Connection Design

- NDS design values
  - Equations
  - Tables
  - Penetration
  - Spacing, end, and edge distance
  - Tension perpendicular to grain

- Materials
  - Wood to wood
  - Wood to steel
  - Wood to concrete
Table 12J  LAG SCREWS: Reference Lateral Design Values, Z, for Single Shear (two member) Connections\(^1,2,3,4\)

for sawn lumber or SCL with both members of identical specific gravity (tabulated lateral design values are calculated based on an assumed length of lag screw penetration, \(p\), into the main member equal to 8D)

<table>
<thead>
<tr>
<th>Side Member Thickness</th>
<th>Lag Screw Diameter</th>
<th>G=0.67 Red Oak</th>
<th>Mixed Maple Southern Pine</th>
<th>G=0.55 Douglas Fir-Larch</th>
<th>G=0.50 Douglas Fir-Larch(N)</th>
<th>G=0.49 Douglas Fir-Larch(N)</th>
<th>G=0.46 Douglas Fir(S) Hem-Fir(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(t_s) in.</td>
<td>D in.</td>
<td>(Z_{sl}) lbs.</td>
<td>(Z_{sL}) lbs.</td>
<td>(Z_{ml}) lbs.</td>
<td>(Z_{l}) lbs.</td>
<td>(Z_{sl}) lbs.</td>
<td>(Z_{sL}) lbs.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1/2</td>
<td>1/4</td>
<td>150</td>
<td>130</td>
<td>110</td>
<td>100</td>
<td>120</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>5/16</td>
<td>170</td>
<td>130</td>
<td>130</td>
<td>120</td>
<td>150</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>180</td>
<td>130</td>
<td>120</td>
<td>120</td>
<td>160</td>
<td>110</td>
</tr>
<tr>
<td>5/8</td>
<td>1/4</td>
<td>180</td>
<td>120</td>
<td>130</td>
<td>120</td>
<td>140</td>
<td>100</td>
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<td>190</td>
<td>140</td>
<td>130</td>
<td>130</td>
<td>160</td>
<td>110</td>
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<td>190</td>
<td>130</td>
<td>140</td>
<td>120</td>
<td>170</td>
<td>110</td>
</tr>
<tr>
<td>3/4</td>
<td>1/4</td>
<td>180</td>
<td>140</td>
<td>140</td>
<td>130</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>5/16</td>
<td>210</td>
<td>150</td>
<td>150</td>
<td>140</td>
<td>180</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>210</td>
<td>140</td>
<td>160</td>
<td>130</td>
<td>180</td>
<td>120</td>
</tr>
<tr>
<td>1</td>
<td>1/4</td>
<td>180</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>160</td>
<td>120</td>
</tr>
<tr>
<td></td>
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<td>230</td>
<td>170</td>
<td>170</td>
<td>160</td>
<td>210</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>230</td>
<td>160</td>
<td>170</td>
<td>160</td>
<td>210</td>
<td>150</td>
</tr>
<tr>
<td>1-1/4</td>
<td>1/4</td>
<td>180</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>160</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>5/16</td>
<td>230</td>
<td>170</td>
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<td>160</td>
<td>210</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
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<td>160</td>
<td>210</td>
<td>150</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1/4</td>
<td>180</td>
<td>140</td>
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<td>140</td>
<td>160</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>5/16</td>
<td>230</td>
<td>170</td>
<td>170</td>
<td>160</td>
<td>210</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>230</td>
<td>160</td>
<td>170</td>
<td>160</td>
<td>210</td>
<td>150</td>
</tr>
</tbody>
</table>
NDS Connection Calculator

- Single fasteners
- All 6 yield modes
- ASD and LRFD
- Free at www.awc.org

Connection Yield Modes

<table>
<thead>
<tr>
<th>Im</th>
<th>276 lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is</td>
<td>311 lbs.</td>
</tr>
<tr>
<td>II</td>
<td>271 lbs.</td>
</tr>
<tr>
<td>IIIm</td>
<td>332 lbs.</td>
</tr>
<tr>
<td>IIIs</td>
<td>199 lbs.</td>
</tr>
<tr>
<td>IV</td>
<td>247 lbs.</td>
</tr>
</tbody>
</table>

Adjust ASD Capacity 199 lbs.

- Bolt bending yield strength of 45,000 psi is assumed.
- The Adjusted ASD Capacity is only applicable for bolts with adequate end distance, edge distance and spacing per NDS chapter 11.
Spacing, End, & Edge Distances

Parallel to Grain loading

Parallel to Grain
Spacing, End, & Edge Distances

Perpendicular to Grain

Perpendicular to grain loading
Connecting Wood

- Tension perpendicular to grain
  - Achilles heel of wood connections

*initiators:*
  - notches
  - large diameter fasteners
  - hanging loads
  - shrinkage
Tension Perpendicular-to-Grain

- NDS Table 12.5.1C
  - Footnote 2
  - Restricts loading the tension zone
  - Applies to ledgers if constructed with a single row of fasteners as shown
Tension Perpendicular-to-Grain

- **NDS Table 12.5.1C**
  - Footnote 2
  - Restricts loading the tension zone
  - Applies to ledgers if constructed with a single row of fasteners as shown
Wet Service Factor, $C_M$

$C_M = 1.0$ if:

- 1 fastener
- 2+ fasteners

Saturated

19% MC

Dry

$C_M = 0.4$ Lateral load ($D > 1/4''$)

fabrication MC
in-service MC

split splice plates
Free to Code Officials

www.woodworks-software.com
Resources

Free DEMO

www.woodworks-software.com

Free technical support

support@woodworks-software.com

Sales support

sales@woodworks-software.com
Resources

Purchase online

woodworks-software.com

10% discount for AWC members

Design Office:  $895
Sizer:  $295 ($805.50)
($265.50)

Also:
Discounts for NEW multi-seat purchases

Free for educators and building officials
Resources

• DCA6 Deck Guide

• DCA6 Presentation
Resources

- Wood Design Focus
- Deck Issue
- www.forestprod.org/

Figure 2. Cyclic Loading Caused by Occupants Swaying Side to Side in Unison
Downloads

AWC DCA6 Deck Guide

AWC DCA6 Presentation

AWC DCA6 One-Pager to Post to Website

Forest Products Society - Wood Design Focus
www.forestprod.org
Questions

James B. Smith, P.E.
Midwest Regional Manager
jsmith@awc.org
608-635-6635
2016 Winter Updates
2016 Winter Updates
Decks attached to dwellings and any detached decks that serve an exit shall comply with appropriate provisions of Subchs. II to X of SPS 321, including all of the following:
SPS 321.225 (1) Decks

(a) Excavation requirements
(b) Footing requirements
(c) Frost penetration requirements
(d) Load requirements
(e) Stair, handrail and guard requirements
(f) Decay protection requirements
SPS 321.225(2)

A deck that complies with the standards in ch. SPS 325 Appendix B and ch. SPS Appendix C, *if applicable*, shall be considered as complying with sub. (1).
SPS 321.24 (3) (d) 8. Along the bottom of door openings that are elevated above-grade.

Note: Flashing placed along the bottom of a door opening that is elevated above-grade can subsequently accommodate adding a deck outside the door.
Decks (continued)

Appendix B = DCA 6

James B. Smith, P.E.
Midwest Regional Manager
AMERICAN WOOD COUNCIL
6457 Woodland Trail, Dane, WI 53529
Office: 608-635-6635
Email: jsmith@awc.org
### Ground Contact Table C - 1

Retention Levels in lbs/ft³

<table>
<thead>
<tr>
<th>Species</th>
<th>Retention Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Pine</td>
<td>.40 ACQ</td>
</tr>
<tr>
<td>DF-L</td>
<td>.40 ACQ</td>
</tr>
<tr>
<td>Hem-Fir</td>
<td>.40 ACQ</td>
</tr>
<tr>
<td>Ponderosa Pine</td>
<td>.40 ACQ</td>
</tr>
<tr>
<td>Red Pine</td>
<td>.40 ACQ</td>
</tr>
</tbody>
</table>
Use Correct Treatment for Actual Conditions

What About Other Conditions?

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<table>
<thead>
<tr>
<th>Use Category</th>
<th>Service Conditions</th>
<th>Typical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC1™</td>
<td>Interior construction Above Ground Dry</td>
<td>Interior construction and furnishings</td>
</tr>
<tr>
<td>UC2™</td>
<td>Interior construction Above Ground Damp</td>
<td>Interior construction</td>
</tr>
<tr>
<td>UC3B™</td>
<td>Exterior construction Above Ground Uncoated or poor water runoff</td>
<td>Decking, deck joists, railings, fence pickets, uncoated millwork</td>
</tr>
<tr>
<td>UC4A™</td>
<td>Ground Contact or Fresh Water Non-critical components</td>
<td>Fence, deck and guardrail posts, crossties &amp; utility poles (low decay areas)</td>
</tr>
<tr>
<td>UC4B™</td>
<td>Ground Contact or Fresh Water Critical components or difficult replacement</td>
<td>Permanent wood foundations, building poles, horticultural posts, crossties &amp; utility poles (high decay areas)</td>
</tr>
</tbody>
</table>
Which wood preservative systems are listed in AWPA Standards?

In today's marketplace, there are many wood preservative systems available to the public. It is important that those wood preservatives reviewed by AWPA's Technical Committees and listed in AWPA Standard U1 are selected at retentions that are appropriate for each Use Category. The following table is specific to Southern pine and Douglas-fir, but should be helpful in determining if the treated wood at your local retailer is treated with the correct preservative at the proper retention (expressed in pounds active ingredient per cubic foot of wood):

<table>
<thead>
<tr>
<th>Code</th>
<th>Preservative Name</th>
<th>UC1, 2</th>
<th>UC3B</th>
<th>UC4A</th>
<th>UC4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Acid Copper Chromate</td>
<td>0.25</td>
<td>0.25</td>
<td>0.50</td>
<td>---</td>
</tr>
<tr>
<td>ACQ</td>
<td>Alkaline Copper Quaternary (Type B or C)</td>
<td>0.25</td>
<td>0.25</td>
<td>0.40</td>
<td>0.60</td>
</tr>
<tr>
<td>ACQ</td>
<td>Alkaline Copper Quaternary (Type A or D)</td>
<td>0.15</td>
<td>0.15</td>
<td>0.40</td>
<td>0.60</td>
</tr>
<tr>
<td>ACZA</td>
<td>Ammoniacal Copper Zinc Arsenate</td>
<td>0.25</td>
<td>0.25</td>
<td>0.40</td>
<td>0.60</td>
</tr>
<tr>
<td>CA-B</td>
<td>Copper Azole, Type B</td>
<td>0.10</td>
<td>0.10</td>
<td>0.21</td>
<td>0.31</td>
</tr>
<tr>
<td>CA-C</td>
<td>Copper Azole, Type C</td>
<td>0.060</td>
<td>0.060</td>
<td>0.15</td>
<td>0.31</td>
</tr>
<tr>
<td>CuN-W</td>
<td>Waterborne Copper Naphthenate</td>
<td>0.070</td>
<td>0.070</td>
<td>0.11</td>
<td>---</td>
</tr>
<tr>
<td>CX-A</td>
<td>Copper HDO</td>
<td>0.206</td>
<td>0.206</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>EL2</td>
<td>DCOI-Imidicloprid-Stabilizer</td>
<td>0.019</td>
<td>0.019</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>PTI</td>
<td>Propiconazole-Tebuconazole-Imidicloprid</td>
<td>0.013</td>
<td>0.018</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>PTI</td>
<td>PTI plus Stabilizer</td>
<td>0.013</td>
<td>0.013</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SBX</td>
<td>Inorganic Boron (Formosan termites)</td>
<td>0.28</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>SBX</td>
<td>Inorganic Boron (non-Formosan termites)</td>
<td>0.17</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
### Table C-2 Alternate Wood Species

#### Joist Span table for:
Western Cedars, Ponderosa Pine and Red Pine

<table>
<thead>
<tr>
<th>Joist Spacing (on center)</th>
<th>Joist Size</th>
<th>Without Overhang</th>
<th>With Overhangs</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>2x6</td>
<td>8'-5&quot;</td>
<td>7'-3&quot;</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>11'-8&quot;</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td></td>
<td>2x10</td>
<td>14'-11&quot;</td>
<td>12'-3&quot;</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>17'-5&quot;</td>
<td>16'-5&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>2x6</td>
<td>7'-8&quot;</td>
<td>7'-3&quot;</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>10'-7&quot;</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td></td>
<td>2x10</td>
<td>13'-0&quot;</td>
<td>12'-3&quot;</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>15'-1&quot;</td>
<td>15'-1&quot;</td>
</tr>
<tr>
<td>24&quot;</td>
<td>2x6</td>
<td>6'-7&quot;</td>
<td>6'-7&quot;</td>
</tr>
<tr>
<td></td>
<td>2x8</td>
<td>8'-8&quot;</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td></td>
<td>2x10</td>
<td>10'-7&quot;</td>
<td>10'-7&quot;</td>
</tr>
<tr>
<td></td>
<td>2x12</td>
<td>12'-4&quot;</td>
<td>12'-4&quot;</td>
</tr>
</tbody>
</table>

1. Spans are based on 40 psf live load, 10 psf dead load, normal loading duration, wet service conditions and deflections of $\Delta = L/360$ for main span and $L/180$ for overhang with a 220-lb. point load.

2. Design values based on northern species with no incising assumed.
Question:

If you have a joist length of 10’ – Douglas Fir Larch Beam,

With column spacing of 8’ OC,

- What is the beam sizing?
- What is the Footing Thickness and Diameter? (for intermediate footing)

Presume 3000 PSF soils.
 Beam and Footing Size

Beam sizing and footing sizing for joist lengths 6’ to 16’

<table>
<thead>
<tr>
<th>Beam and Footing Sizes with Overhangs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam and Footing Sizes with Overhangs</td>
</tr>
<tr>
<td>Based on No. 2 or better Southern Pine, Douglas Fir-Larch2, and Ponderosa Pine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Joist Length (JL)</th>
<th>Post Spacing (Measured Center to Center)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>5'</td>
</tr>
<tr>
<td>Southern Pine Beam</td>
<td>1-2x8 1-2x8 2-2x8 2-2x8 2-2x10 2-2x12 3-2x12 3-2x12</td>
</tr>
<tr>
<td>Douglas Fir-Larch Beam</td>
<td>1-2x8 2-2x6 2-2x8 2-2x10 2-2x10 2-2x12 3-2x10 3-2x12</td>
</tr>
<tr>
<td>Ponderosa Pine Beam</td>
<td>1-2x8 2-2x6 2-2x8 2-2x10 2-2x10 2-2x12 3-2x10 3-2x12</td>
</tr>
<tr>
<td>Corner Footing</td>
<td>10 9 8 12 10 8 9 13 11 10 15 12 11 10 15 12 11 10</td>
</tr>
<tr>
<td>Intermediate Footing</td>
<td>13 11 9 14 12 10 15 13 11 17 14 12 18 15 13 20 16 14 21 17 15</td>
</tr>
<tr>
<td>Footing Thickness</td>
<td>6 6 6 6 6 8 8 8 8 8 8 8 10</td>
</tr>
<tr>
<td>10'</td>
<td>12'</td>
</tr>
<tr>
<td>Southern Pine Beam</td>
<td>1-2x8 2-2x6 2-2x8 2-2x10 2-2x10 2-2x12 3-2x10 3-2x12</td>
</tr>
<tr>
<td>Douglas Fir-Larch Beam</td>
<td>1-2x8 2-2x6 2-2x8 2-2x10 2-2x10 2-2x12 3-2x10 3-2x12</td>
</tr>
<tr>
<td>Ponderosa Pine Beam</td>
<td>1-2x8 2-2x6 2-2x8 2-2x10 2-2x10 2-2x12 3-2x10 3-2x12</td>
</tr>
<tr>
<td>Corner Footing</td>
<td>11 9 8 12 10 9 13 11 9 14 12 10 15 12 11 16 13 11 16 13 11 16 13 11 16 13</td>
</tr>
<tr>
<td>Intermediate Footing</td>
<td>13 11 9 14 12 10 15 13 11 17 14 12 18 15 13 20 16 14 21 17 15</td>
</tr>
<tr>
<td>Footing Thickness</td>
<td>6 6 6 6 6 8 8 8 8 8 8 8 10</td>
</tr>
</tbody>
</table>

Notes:
1. Joist Length ($L$) is Joist Span ($L$) plus any cantilever at the beam that is being sized.
3. All footing sizes above are base diameters (in inches) and are listed for THREE SOIL CAPACITIES. Soil capacity is based on the requirements of State of Wisconsin SPS 321.15 (3).
4. For square footings, insert the diameter ($d$) into the following formula: $\sqrt{2000}$ psf Soil³ $\times (d/2)^2$. This number will give you the square dimension and shall be rounded up to the nearest inch.

<table>
<thead>
<tr>
<th>Soil Capacity</th>
<th>Footing Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 psf Soil³</td>
<td>0 0 0</td>
</tr>
<tr>
<td>3000 psf Soil³</td>
<td>0 0 0</td>
</tr>
<tr>
<td>4000 psf Soil³</td>
<td>0 0 0</td>
</tr>
</tbody>
</table>
Beam Sizing:
2-2x10

Footing Thickness and Diameter:
8” Thick by 15” diameter
(Intermediate Footing)
Framing around Projections

- Double where joist tees into member
- Triple where the double member tees into beam
- Fasteners should extend into all members of the trimmer joists, hanger or ledgers. Necessary to transfer loads to all members and load distribution.

*Trimmer joist may be double if joists are spaced 24" o.c. or if trimmer length is 8'-6" or less*
Stagger Lag screws/bolts to develop full strength of ledger board @ 2” from top and 2” from bottom. Do not want to drive into end grain of top or bottom chord of truss. Much less strength.

- Use ½ Dia. X 6” long lag screws or bolts.
- Pre-drill lead holes.
Wood Truss Floor Systems

Decks connected to Wood Truss Floor Systems

Detail for decks framing into trusses perpendicular with foundation walls
Detail 1
Ledger Perpendicular to Floor Truss

**WALL SECTION**

- **2X4 RIBBON BOARD, DO NOT ATTACH LEDGER TO RIBBON BOARD**
- **EXISTING STUD WALL**
- **MAX 15/32" THICK WOOD STRUCTURAL PANEL SHEATHING FASTENED PER BUILDING CODE**
- **STAGGERED 1/2" DIA. x 6" LAG SCREWS WITH WASHERS OR 1/2" DIAMETER BOLTS WITH NUTS AND WASHERS (SEE INSTALLATION SECTION OF REPORT FOR MINIMUM CORROSION RESISTANCE REQUIREMENTS), INSTALL ONE FASTENER THROUGH CENTERLINE OF EACH 2-PLY END VERTICAL AND/OR KEY-BLOCK PER THE SPACING REQUIREMENTS PROVIDED BELOW AND IN TABLES 1 & 2, TAKE CARE SO FASTENERS DO NOT INTERFERE WITH CONNECTOR PLATES AT TOP AND BOTTOM CHORD JOINTS**

**METAL CONNECTOR PLATE, TYP.**

- **DOUBLE 2X4 END VERTICAL AND/OR KEY-BLOCK MINIMUM SPECIFIC GRAVITY, G = 0.42**
- **METAL PLATE CONNECTED WOOD FLOOR TRUSS @ 24" ON-CENTER, MAXIMUM**

**DECK BOARDS AND JOIST**

**JOIST HANGER**

- **2X10 OR 2X12 PRESSURE-PRESERVATIVE TREATED (PPT) OR APPROVED DECAY-RESISTANT LEDGER, MINIMUM SPECIFIC GRAVITY, G = 0.43**

**LOAD BEARING WALL**

**NOTE** - **EXTERIOR CLADDING AND FLASHING NOT SHOWN FOR CLARITY.**
Ledger Board Attachment Detail 3
Perpendicular to Floor Truss

**LEDGER ATTACHED TO ENDS OF TRUSSES**

---

**2X4 RIBBON BOARD, DO NOT ATTACH LEDGER TO RIBBON BOARD**

**METAL CONNECTOR PLATE, TYP.**

**DOUBLE 2X4 END VERTICAL MINIMUM SPECIFIC GRAVITY, g = 0.42**

**METAL PLATE CONNECTED WOOD FLOOR TRUSS @ 24" ON-CENTER, MAXIMUM**

**LOAD BEARING WALL**

**DECK BOARDS AND JOIST**

---

**APPLY 24" LONG, FULL-HEIGHT 7/16" 24/16 (MINIMUM) SPAN RATED OSB OR PLYWOOD GUSSET TO ONE SIDE AT END OF TRUSS, CAREFULLY NOTCH GUSSET FOR TIGHT FIT AROUND RIBBON BOARD. ATTACH GUSSET TO EACH 4X2 TRUSS MEMBER WITH 1 ROW OF 10d (0.131" x 3") NAILS SPACED AT 3" OC,**

**HOLDOWN DEVICE CAPABLE OF RESISTING 750 LBS MINIMUM. INSTALL HOLDOWNS AT FOUR (4) LOCATIONS, EVENLY DISTRIBUTED ALONG LEDGER WITH ONE (1) HOLDOWN WITHIN 2' OF EACH END OF LEDGER. ATTACH HOLDOWN TO 2-PLY TRUSS END VERTICAL WITH 3/8" DIA. FULLY THREADED LAG SCREW PRE-DRILLED, WITH MINIMUM 3" PENETRATION INTO END VERTICAL AND TO DECK JOIST PER MANUFACTURER'S SPECIFICATIONS. INSTALL LAG SCREW THROUGH CENTER OF 2-PLY END VERTICAL SO AS NOT TO DAMAGE/DISTURB WITH/DAMAGE CONNECTOR PLATES**

---

Refer to Detail 1 for additional information.
Wood Truss Floor Systems

- Decks framing into Wood Truss Floor Systems *parallel* with foundation wall
**WALL SECTION**

NOTE - EXTERIOR CLADDING AND FLASHING NOT SHOWN FOR CLARITY.

12" LONG 2X4 SPF (MIN) KEEPER-BLOCKS AT EACH KEY-BLOCK LOCATION, CENTER KEEPER-BLOCKS ABOUT KEY-BLOCK, ATTACH TO LADDER FRAME CHORDS W/ 3-12d (0.131"X3.25") NAILS AND TO EACH KEY-BLOCK WITH 2-12d NAILS. (SEE KEEPER-BLOCK DETAIL)

MAX 15/32" THICK WOOD STRUCTURAL PANEL SHEATHING FASTENED PER BUILDING CODE

STAGGERED 1/2" DIA. X 6" LAG SCREWS WITH WASHERS OR 1/2" DIA. BOLTS WITH NUTS AND WASHERS (SEE INSTALLATION SECTION OF REPORT FOR MINIMUM CORROSION RESISTANCE REQUIREMENTS), INSTALL ONE FASTENER THROUGH CENTERLINE OF EACH 4X4 VERTICAL TRUSS WEB AND/OR KEY-BLOCK PER THE SPACING REQUIREMENTS PROVIDED BELOW AND IN TABLES 3 & 4. TAKE CARE SO FASTENERS DO NOT DAMAGE/DISTURB WITH CONNECTOR PLATES AT TOP AND BOTTOM CHORD JOINTS

METAL PLATE CONNECTED WOOD FLOOR TRUSS @ 24" ON-CENTER, MAXIMUM

***NOTE - IF VERTICAL WEBS IN LADDER FRAME ARE ONLY 1-PLY 2X4s INSTEAD OF 4X4 LUMBER, DO NOT ATTACH LEDGER TO 2X4 VERTICAL WEB MEMBERS, INSTALL KEY-BLOCKS (SEE KEY-BLOCK DETAIL BELOW) AT THE REQUIRED SPACING INDICATED IN TABLES 3 & 4

DECK BOARDS AND JOIST

JOIST HANGER

LOAD BEARING WALL

2X10 OR 2X12 PRESSURE-PRESERVATIVE TREATED (PPT) OR APPROVED DECAY-RESISTANT LEDGER. MINIMUM SPECIFIC GRAVITY, G = 0.43

FLOOR LADDER FRAME WITH MINIMUM 4X2 SPF CHORD LUMBER AND 4X4*** SPF VERTICAL WEBS AT 16 ON-CENTER, MAX, AND/OR 2-PLY 2X4 KEY-BLOCKS. MINIMUM SPECIFIC GRAVITY, G = 0.42
LEDGER ATTACHED TO SIDE OF FLOOR LADDER FRAME

APPLY MINIMUM 2x6 SPF BLOCK OF SAME DEPTH AS DECK JOISTS TO ONE SIDE OF EACH 4X4 VERTICAL WEB OR KEY-BLOCK TO WHICH THE HOLDOWN IS ATTACHED, CUT BLOCK TO FIT TIGHT BETWEEN EXTERIOR SHEATHING AND SIDE OF FIRST INTERIOR FLOOR TRUSS. CAREFULLY NOTCH BLOCK FOR TIGHT FIT AROUND TOP CHORD OF LADDER FRAME. ATTACH BLOCK TO SIDE OF 4X4 WEB OR 2-PLY KEY-BLOCK WITH 6-10d (0.131" x 3") NAILS AND TO FLOOR SHEATHING WITH 1-ROW OF 7-10d (0.131" x 3") NAILS SPACED EVENLY ALONG BLOCK.

FLOOR LADDER FRAME WITH MINIMUM 4X2 SPF CHORD LUMBER AND 4X4 VERTICAL WEBS AT 18 ON-CENTER, MAX., AND/OR 2-PLY 2X4 KEY-BLOCKS, MINIMUM SPECIFIC GRAVITY, G = 0.42

LOAD BEARING WALL

HOLDOWN DEVICE CAPABLE OF RESISTING 750 LBS MINIMUM. INSTALL HOLDOWNS AT FOUR (4) LOCATIONS, EVENLY DISTRIBUTED ALONG LEDGER WITH ONE (1) HOLDOWN WITHIN 2' OF EACH END OF LEDGER. ATTACH HOLDOWN TO 4X4 VERTICAL TRUSS WEB OR 2-PLY KEY-BLOCKS WITH 3/8" DIA. FULLY THREADED LAG SCREW PRE-DRILLED, WITH MINIMUM 3-1/2" PENETRATION INTO WEB/KEY-BLOCK, AND TO DECK JOIST PER MANUFACTURER'S SPECIFICATIONS. INSTALL LAG SCREW THROUGH CENTER OF WEB OR KEY-BLOCK SO AS NOT TO DAMAGE/DISTURB WITH OR DAMAGE CONNECTOR PLATES

DECK BOARDS AND JOIST

METAL PLATE CONNECTED WOOD FLOOR TRUSS @ 24" ON-CENTER, MAXIMUM

REFER TO DETAIL 2 FOR ADDITIONAL INFORMATION
Ledger Boards

- Nominal 2 x 10 or 2 x 12 lumber.
- Follow Fastener schedule.
- For heavy loads or where truss conditions may be compromised, utilize ½ inch plywood gusset fastened to the end panel of the truss with nails spaced 3” OC.
Final Thoughts

- Make sure care is taken not to split members.
- Make sure care is taken not to damage truss plates or joist hangers.
- Make sure care is taken to properly flash ledger boards so as to prevent moisture penetration into the structure.
- Do it right the first time.
2016 Winter Updates
2016 UDC CODE CHANGES - PART II

A quick look at the up-coming code changes
YOUR PRESENTER

- John J Wotruba
- UDC/HUD Consultant - DSPS
- 26 years with the department
- Last 9 in the UDC Program
- Contact information: Phone: (920)360-0020
e-mail: jack.wotruba@wisconsin.gov

- (Cards Available)
CHANGES

- Presentation II
- Covering Sections 70 - 142 in the proposed rules package.
SPS 321.16(1)(A)

- Removed ramps from this section.
- Created SPS 321.16 (2) (d) Subsection (1) (a) does not apply to the footing for a ramp and its handrail posts unless the ramp abuts a frost-protected stoop or landing, in which case only the footing for that abutting end of the ramp is required to have the frost protection under sub. (1) (a), such as by bearing onto the stoop or landing, so that a tripping hazard is not created.
SPS 321.18 (1)(c) 3.d. (CREATED)

- SPS 321.18 (1) (c) 3. d. - Alternate foundation anchorage, designed and spaced in accordance with structural analysis and as required to provide equivalent anchorage to the requirements of subd. 3. a., is allowable.
SPS 321.18 (1) (d) 2. c. Fastening of the blocking or bridging shall be in accordance with structural analysis or the fastener Table 321.02-2.
SPS 321.18(1) CONT.

- **SPS 321.18 (1) (d) 2. c. Note:** The floor-framing elements required in this section are intended to provide lateral support to the top of the foundation wall. See SPS 321.22 (9) for further requirements relating to floor framing, including for bridging of floor framing to provide restraint against rotation or lateral displacement of the floor framing.
PORTION OF TABLE 321.02-2

- SPS 321.02 (2) (h) Table 321.02-2
- MINIMUM FASTENER SCHEDULE TABLE
- Other interior and exterior panel products and finishes installed per manufacturer requirements.
- For engineered connectors, use manufacturer’s specified fasteners.
- Description of Building Materials/Connection | Number and Type of Fastener

<table>
<thead>
<tr>
<th>Floor Framing</th>
<th>2 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joist to joist, face nailed over support</td>
<td>2−12d 3−8d</td>
</tr>
<tr>
<td>Joist to sill or girder, toe nail</td>
<td>2−16d, 3−8d</td>
</tr>
<tr>
<td>Band or rim joist to joist, end nail</td>
<td>3−16d</td>
</tr>
<tr>
<td>Band or rim joist to sill or top plate</td>
<td>2−16d at 16” o.c.</td>
</tr>
<tr>
<td>Bridging to joist, toe nail each end</td>
<td>2−8d</td>
</tr>
<tr>
<td>Built-up girder and beams, top loaded</td>
<td>10d at 32” o.c. at top and bottom and staggered and two at ends and at each splice</td>
</tr>
<tr>
<td>Built-up girder and beams, side-loaded</td>
<td>16d at 16” o.c. at top and bottom and staggered and two at ends and at each splice</td>
</tr>
<tr>
<td>Ledger strip to beam, face nail</td>
<td>3−16d each joist</td>
</tr>
<tr>
<td>Joist on ledger to beam, toe nail</td>
<td>3−8d</td>
</tr>
</tbody>
</table>
SPS 321.18 (4)  

SPS 321.18 (4) WOOD FOUNDATIONS. Wood foundations shall be designed and constructed in accordance with the wood-foundation standard adopted in Table 320.24-6m.
SPS 321.22(9)(A)

(a) **Note:** This 4:1 ratio means bridging is required for wood-framed floors having nominal 2X10 or deeper solid-sawn-lumber joists, to provide restraint against rotation or lateral displacement.

(b) **Note:** See SPS 321.18 (1) (d) for further requirements relating to floor framing, including for bridging or blocking of floor framing to provide lateral support to the top of foundation walls.
10) **SILL PLATES.** All of the following requirements apply to a sawn-lumber sill plate with uniform loading that is partially extended beyond the load-bearing surface of a foundation wall in order to put the exterior surface of an upper-lying wall flush with or beyond the exterior surface of insulation that is placed on the outside of the foundation wall:
(a) The center of any anchor bolt shall be set back from the side edge of the sill plate by a distance of at least 4 times the diameter of the bolt.

(b) The thickness of the concrete or mortar cover around any anchor bolt shall comply with ACI 318 section 7.7.

Note: Under ACI 318 section 7.7, the minimum cover for a 5/8-inch-diameter or smaller bolt is 1 1/2 inches.
c) With wood floor joists that are parallel to the foundation wall, the sill plate may not extend beyond the load-bearing surface of the wall by more than one-half of the nominal thickness of the joist that bears on the sill plate.

Note: As used throughout this chapter and in the standards that the chapter incorporates by reference, the shorter side of the cross-sectional area of a wood member is the thickness of the member. The longer side of the cross-sectional area is the depth, when the longer side is vertical; and it is the width when the longer side is horizontal.
SILL PLATES CONTINUED

- **Note:** Under sub. (6), wood floor joists that are perpendicular to the foundation wall can extend beyond the foundation wall by a distance of up to the depth of the joist.

- **Note:** Subsection (1) (d) requires a full-width sill plate for floor joists over open-core masonry units.
**Floor Joist Overhang**

2” min. per NDS Table 11.5.1A

Min. width of sill plate resting on foundation = 3.75” when using ½” dia. anchor bolt with max. hole dia. of 5/16”

OK to Have Joist Overhang up to the Depth of Joist.

1.5” min. cover per ACI 318 s. D.8.2

**Figure 1**

Floor framing perpendicular to foundation wall
FLASHING

- **SPS 321.24 (3) (e)** For a roof that intersects with an upper-lying head wall and rake wall, such as where a dormer is provided, the vertical metal flashing along the rake wall shall extend down the roof at least one-half inch past the vertical flashing on the head wall.

- **Note:** A head wall as addressed in this paragraph intersects a sloping roof at a horizontal line along the top of a roof segment. A rake wall intersects a sloping roof along the side of a roof segment.

- **(f)** For a roof eave that intersects with a sidewall, the end of the roof flashing shall be installed so that it diverts water away from the sidewall and onto the roof or into the gutter.

- **Note:** See s. SPS 321.26 (8) for further requirements relating to flashing for masonry.
1. Where a masonry foundation wall has an open top course, a bottom plate at least as wide as the foundation wall shall be fastened to the foundation.
Mountain Foundation Walls with Open Top Course, the minimum width of an individual piece making up the bottom plate shall be at least 5 1/2 inches.

Note: A sill plate can be made of multiple pieces to achieve the full width.
(b) *Extension beyond the bearing surface.* All of the following requirements apply to a sawn-lumber sill plate with uniform loading that is partially extended beyond the load-bearing surface of a foundation wall in order to put the exterior surface of an upper-lying wall flush with or beyond the exterior surface of insulation which is placed on the outside of the foundation wall:
**Bottom Plate Overhang**

- **Blocking @ 32” max. o.c.**
  - Per s. DSPS 321.18

- **Sheathing**

- **Extra Rim Joist**

- **3.75” min. when using 3/4” dia. anchor bolt with max. hole dia. of 5/16”**

- **Up to 1.5 inch overhang**

**Figure 2**

Floor framing parallel to foundation wall (Option 1)
1. The center of any anchor bolt shall be set back from the side edge of the sill plate by a distance of at least 4 times the diameter of the bolt.

2. The thickness of the concrete or mortar cover around any anchor bolt shall comply with ACI 318 section 7.7.

**Note:** Under ACI 318 section 7.7, the minimum cover for a 5/8-inch-diameter or smaller bolt is 1 1/2 inches.
3. Where a stud wall bears directly on a double bottom plate, the plate may not extend more than 1 1/2 inches beyond the load-bearing surface of the foundation wall.

4. Where a stud wall bears directly on a single bottom plate, the plate may not extend more than 1 inch beyond the load-bearing surface of the foundation wall.
Double Bottom Plate

Blocking @ 32” max. o.c. Per s. DSPS 321.18

Sheathing

Double 2 x Sill Plate

3.75” min. when using ½” dia. anchor bolt with max. hole dia. of 9/16”

Up to 1.5 inch Overhang

Figure 3
Floor framing parallel to foundation wall (Option 2)
Figure 4
Stud wall directly on sill plate

- 1.5 inches max. overhang with double 2 X sill plate
- 1.0 inches max. overhang with single 2 X sill plate

3.75" min. when using ½" dia. anchor bolt with max. hole dia. of 9/16"
WALL BRACING NOTES

- SPS 321.25 Table 321.25-A footnote d Use of stud heights that range from over 10 feet to 12 feet for bearing and exterior nonbearing walls is prohibited unless supported by structural analysis. The allowable deflection may not exceed whichever of the following are applicable:
  - Interior walls and partitions — span height/180.
  - Exterior walls with plaster or stucco finish — span height/360.
Exterior walls with other brittle finishes — span height/240.
Exterior walls with flexible finishes — span height/120.
Exterior walls with interior gypsum wallboard finish — span height/180.
Any manufacturer-specified limits for any included windows or doors.
### TABLE - I

- Table 321.25-I (Intermittent Sheathing)

**REQUIRED NUMBER OF INTERMITTENT BRACED WALL PANELS ON WALLS PARALLEL TO EACH RECTANGLE SIDE AT EACH FLOOR LEVEL**

*a, b, c, d, e, f, h, j*
Table 321.25-J (Continuous sheathing)

REQUIRED LENGTH OF CONTINUOUS BRACING ON WALLS PARALLEL TO EACH RECTANGLE SIDE AT EACH FLOOR LEVEL a,b,c,d,e,g,h,j
FOOTNOTE - J

- SPS 321.25 Table 321.25-I footnote j Any floor, habitable or otherwise, that is contained wholly within the roof rafters or roof trusses is exempt from being considered a floor for purposes of determining wall bracing if the top-of-wall-to-ridge height does not exceed 20 feet and if no opening in the roof exceeds 48 inches in height.

- Table 321.25-J footnote j Any floor, habitable or otherwise, that is contained wholly within the roof rafters or roof trusses is exempt from being considered a floor for purposes of determining wall bracing if the top-of-wall-to-ridge height does not exceed 20 feet and if no opening in the roof exceeds 48 inches in height.
WALL BRACING

- SPS 321.25 (8) (a) (Note) [2]: For a walk-out basement where some of the walls are concrete and other walls or portions thereof are wood-framed, the Department considers a minimum 8-inch-nominal-thickness poured-in-place concrete basement wall as being equivalent in lateral load and shear resistance to any of the allowable wood-framed wall bracing materials.
To determine the required bracing for a walk-out basement, first draw a rectangle around the entire floor plan and projections as if all of the walls are wood-framed. Determine the required bracing amounts per the chosen bracing material and method and then locate the bracing to meet the requirements of Figure 321.25-C.
Any required braced wall panel locations that occur on a wall or portion of a wall that is actually of poured-in-place concrete construction is considered equivalent, and that amount of bracing will count towards the minimum required amount and will not need to be provided in another location on that rectangle side.
SPS 321.27 (4) (d) *Bearing*. The required bearing for wood rafters shall be in accordance with the NDS adopted in Table 320.24-6m, except in no case shall the bearing be less than 1½ inches on wood or metal or less than 3 inches on masonry or concrete.
SHINGLES

- **SPS 321.28 (3) (a) 2.** Each shingle package shall be labeled by the manufacturer to indicate conformance to the applicable ASTM standard for each type of shingle or the exception in par. *(b)*.

- **SPS 321.28 (3) (a) 6.** All fasteners for shingles shall be corrosion-resistant.
VALLEYS

- **SPS 321.28 (7) (c) Flashing of closed valleys.** Where shingles are laced or woven over the valley, the valley shall be flashed with one of the following:
  1. At least one layer of 50-pound roofing, at least 20 inches wide, over a layer of number 15 roofing underlayment.
  2. A product labeled as meeting the requirements of ASTM D1970.
CHAPTER 322 CHANGES

- Quick overview of changes and/or updates
RES-CHECK CHANGES

- As of January 1, 2016, Rescheck will no longer have a “Wisconsin 2009” code tab for demonstrating building envelope and heat loss calculations.

- Res-Check can be used, but one must select “IECC 2009” to demonstrate building envelope compliance. Heat loss calculations will no longer be addressed by Rescheck.
### TABLE 322.31-1

**INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Fenestration U-Factor</th>
<th>Skylight U-Factor</th>
<th>Ceiling R-Value</th>
<th>Wood Frame Wall R-Value</th>
<th>Mass Wall R-Value</th>
<th>Floor R-Value</th>
<th>Basement or Crawl Space Wall R-Value</th>
<th>Crawl Space Wall R-Value</th>
<th>Heated Slab R-Value</th>
<th>Unheated Slab R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.35</td>
<td>0.60</td>
<td>49&lt;sup&gt;g&lt;/sup&gt;</td>
<td>15/19&lt;sup&gt;h&lt;/sup&gt;</td>
<td>10/13</td>
<td>10/15</td>
<td>10/15</td>
<td>10/15</td>
<td>10/15</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>0.35</td>
<td>0.60</td>
<td>49&lt;sup&gt;g&lt;/sup&gt;</td>
<td>19/21&lt;sup&gt;h&lt;/sup&gt;</td>
<td>10/13</td>
<td>10/15</td>
<td>10/15</td>
<td>10/15</td>
<td>10/15</td>
<td>10</td>
</tr>
</tbody>
</table>

<sup>a</sup> R-values are minimums. U-factors are maximums.

<sup>b</sup> The first R-value applies to continuous insulation. The second R-value applies to framing cavity insulation. Either insulation meets the requirement. “15/19” means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. “10/13” means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
**TABLE 322.31-2**

**EQUIVALENT U-FACTORS**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Fenestration U-Factor</th>
<th>Skylight U-Factor</th>
<th>Ceiling U-Factor</th>
<th>Wood Frame Wall U-Factor</th>
<th>Mass Wall U-Factor</th>
<th>Floor U-Factor</th>
<th>Basement Wall U-Factor</th>
<th>Crawl Space Wall U-Factor</th>
<th>Unheated Slab U-Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.35</td>
<td>0.60</td>
<td>0.026</td>
<td>0.060</td>
<td>0.060^a</td>
<td>0.033</td>
<td>0.065</td>
<td>0.065</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>0.35</td>
<td>0.60</td>
<td>0.026</td>
<td>0.057</td>
<td>0.057^a</td>
<td>0.033</td>
<td>0.065</td>
<td>0.065</td>
<td>10</td>
</tr>
</tbody>
</table>

^a When more than half the insulation is on the interior, the mass wall U-factors shall be the same as the frame wall U-factor.
TOTAL UA ALTERNATIVE (RESCHECK APPROACH) SPS 322.31-4

- Per Proposed Bldg
  - $U_{wall} \times A_{wall}$
  - $U_{roof} \times A_{roof}$
  - $U_{door} \times A_{door}$
  - $U_{window} \times A_{window}$
  - $U_{skylight} \times A_{skylight}$
  - Etc.

- Per Table 322.31-4
  - $U_{wall} \times A_{wall}$
  - $U_{roof} \times A_{roof}$
  - $U_{door} \times A_{door}$
  - $U_{window} \times A_{window}$
  - $U_{skylight} \times A_{skylight}$
  - Etc.

$U_{Proposed} \times A_{Proposed} \leq U_{Allowed} \times A_{Proposed}$
ATTIC-ACCESS COVER TO BE INSULATED
SPS 322.32(1)(B)

- To be weatherstripped & insulated to level equivalent to insulation on the surrounding surfaces
- Wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is used
- Req’t to prevent loose fill insulation from spill into living space, as well a provide permanent means of maintaining the installed R–value
The requirements of Table 322.31-1 are applicable to mass walls.

No longer requires at least 50% of the required insulation to be on the exterior of, or integral to, the wall.
SKYLIGHT INSULATION REQ’TS
SPS 322.32(9)(B)

- The vertical and flared walls in a skylight shall meet the insulation requirements for walls. Tube skylights shall be insulated per manufacturer’s recommendations.
Any heated or unheated slab floor, the bottom of which is < 12” below adjacent grade, shall be provided with perimeter insulation in accordance with Table 322.31-1 or Table 322.31-4, except as provided in par. (b).
Insulation on a foundation wall for a basement may be interrupted at the junction with a foundation wall.
The edges of the vapor retarder shall extend at least 6 inches up the foundation wall and shall be attached and sealed to the foundation wall or insulation.
2 options to demonstrate compliance

- When tested air leakage is < 7 ACH when tested with a blower door at pressure of 33.5 psf
  Testing after rough in and installation of building envelope penetrations

- When items listed in Table 332.37, applicable to the method of construction, are field verified. Inspector may request an approved party independent from the installer to inspect the air barrier & insulation
<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air barrier and thermal barrier</td>
<td>Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier. Breaks or joints in the air barrier are filled or repaired.</td>
</tr>
<tr>
<td>Ceiling/attic</td>
<td>Air-permeable insulation is not used as a sealing material. Air-permeable insulation is inside of an air barrier.</td>
</tr>
<tr>
<td>Walls</td>
<td>Corners and headers are insulated. Junction of foundation and sill plate is sealed.</td>
</tr>
<tr>
<td>Windows and doors</td>
<td>Space between window-door jambs and framing is sealed.</td>
</tr>
<tr>
<td>Rim joists</td>
<td>Rim joists are insulated and include an air barrier.</td>
</tr>
<tr>
<td>Floors (including above-garage and cantilevered floors)</td>
<td>Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.</td>
</tr>
<tr>
<td>Crawl space walls</td>
<td>Insulation is permanently attached to walls. Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.</td>
</tr>
<tr>
<td>Shafts, penetrations</td>
<td>Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.</td>
</tr>
<tr>
<td>Narrow cavities</td>
<td>Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Garage separation</td>
<td>Air sealing is provided between the garage and conditioned spaces.</td>
</tr>
<tr>
<td>Recessed lighting</td>
<td>Recessed light fixtures are air tight, IC rated, and sealed to drywall.</td>
</tr>
<tr>
<td>Recessed lighting</td>
<td>Exception—fixtures in conditioned space.</td>
</tr>
<tr>
<td>Plumbing and wiring</td>
<td>Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.</td>
</tr>
<tr>
<td>Shower/tub on exterior wall</td>
<td>Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.</td>
</tr>
<tr>
<td>Electrical/phone box on exterior walls</td>
<td>Air barrier extends behind boxes or air sealed—type boxes are installed.</td>
</tr>
<tr>
<td>Common wall</td>
<td>Air barrier is installed in common wall between dwelling units.</td>
</tr>
<tr>
<td>HVAC register boots</td>
<td>HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.</td>
</tr>
<tr>
<td>Fireplace</td>
<td>Fireplace walls include an air barrier.</td>
</tr>
</tbody>
</table>

History: CR 08–043: cr. Register March 2009 No. 639, eff. 4–1–09; CR 15–041: cr. (6), Table 322.37 Register December 2015 No. 720, eff. 1–1–16; correction in 6(a) 6 made under s. 35.17, Stats., Register December 2015 No. 720.
VAPOR RETARDER INSTALLATION
SPS 322.38(1)(B)

- Vapor retarder shall be continuous.
  - Except as provided in subd. 2.
- Seams that are not over a framing member shall be taped or sealed.
Taping or sealing a vapor retarder is not required around doors and windows, behind bathtub enclosures, and at top and bottom wall plates, if the retarder is held to those materials in an airtight manner by other building components, such as gypsum wallboard.
No vapor retarder is required over cavities that have at least 50% of the required R-value provided by spray-applied foam having a perm rating of 1.0 or less, unless required by the foam manufacturer.
A vapor retarder for a floor over an open unheated area may consist of 5/8” tongue-and-groove oriented-strand board, or ¾-inch tongue-and-groove CDX plywood, which is exposure-rated plywood.
Cooling supply ducts that pass through unconditioned spaces (attics, garages) to be provided w/min. R-8 insulation.

Exterior of the insulation shall be covered w/vapor retarder that meets the requirements in SPS 322.38(1)
**DUCT TIGHTNESS**
SPS 322.43(7)

- Tightness Test **NOT** req’d if the air handler and all ducts are located within conditioned space

**Postconstruction Test:**
- Leakage to outdoor ≤ 8 cfm/100 sf of conditioned floor area OR
- Total leakage ≤ 12 cfm per 12 sf of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer’s air handler enclosure.
- All register boots shall be taped or otherwise sealed during the test.
**DUCT TIGHTNESS**  
**SPS 322.43(7)**

- **Rough-in Test:**
  - Total leakage shall be less than or equal to 6 cfm/100 sf of conditioned floor area when tested @ pressure differential of 0.1 inches w.g. (25 Pa) across the roughed in system (includes air handler enclosure)
  - All register boots shall be taped or sealed during test
  - If no air handler is installed at test time, total leakage shall be \( \leq 4 \) cfm/100 sf of conditioned floor area
Minimum *R-3* required on
- HVAC systems
  - Exception: Piping that conveys fluids between 55 & 105 °F

Minimum *R-2* required on
- All circulating domestic hot water systems
  - Systems also require a readily accessible manual switch
Automatic or Gravity Dampers

**SPS 322.47(1)**

- Mechanical ventilation outdoor air intakes & exhausts require automatic (motorized) or gravity dampers that close when the ventilation system is not operating.
SNOW MELT SYSTEM CONTROLS
SPS 322.47(2)

- Applicable to snow- and ice-melting systems supplied with energy service through the bldg.

- Require automatic controls capable of shutting off the system when the pavement temperature is > 50°F and no precipitation is falling and automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F when the potential for snow or ice is negligible.
INDOOR POOLS

SPS 322.48

- Indoor Pool Heaters
  - with a readily accessible on-off switch
  - fired by natural gas not allowed to have continuously burning pilot lights

- Time switches to automatically turn off and on heaters and pumps according to a preset schedule installed on swimming pool heaters and pumps.

- Exceptions
  - Public health standards require 24-hour pump operation
  - Pumps operating pools with solar-waste-heat recovery heating systems
A minimum of 50% of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

Definition of “high-efficacy lamp”

- **Compact fluorescent lamps T-8 or smaller diameter linear fluorescent lamps, or lamps with a minimum efficacy of:**
  - 60 lumens/W for lamps > 40 watts,
  - 50 lumens/W for lamps > 15 watts up to 40 watts, and
  - 40 lumens/W for lamps < 15 watts or less

Incandescent lamps are NOT “high efficacy lamps”
Footnote 5 To combustible materials or metal cabinets. If the underside of such combustible material or metal cabinet is protected with asbestos millboard at least ¼” thick covered with sheet metal of not less than No. 28 gauge, the distance may be < 24”. Also, if the manufacturer of the range, cooktop, or cooking stove specifies a shorter clearance, that clearance may be used instead.
SOLID FUEL-FIRED WATER-HEATING
SPS 323.04(4)(B)

- Solid fuel-fired water-heating appliances installed inside one or two family dwellings are exempt from the requirements of SPS 341.49(3) (ie. boiler code requirements)
Ground-based solid-fuel-burning appliances shall be installed in accordance with the manufacturer’s specifications.
Min. Flow rate of tankless water heater determined by multiplying 0.65 by the calculated hot water gallons/minute demand, as determined by SPS 383 Tables 382.40-1b and 382.40-3, provided the heater will achieve a water temperature of 110°F at the terminal fitting or faucet.
TANKLESS WATER HEATERS
The sizing method listed previously, may not be used for sizing a water heater serving a high-flow fixture, hose bibb, a hydrant, or a fixture that is required to have a supply line with a diameter larger than ½".
“High-flow fixture” means a fixture with a flow rate > 4 gallons/minute, @ 80 lbs/inch, and water velocity ≤ 8 ft/sec

A trap may be omitted in local waste piping having a length ≤ 20 ft
FLOOR DRAINS FOR GARAGES
SPS 325.1(4)

- Trap may be omitted for garage-floor drain that discharges to the ground surface.
- Sediment trap shall be removable.
- Grate may be nonmetallic if it has a thickness & strength that will withstand the anticipated loads.
QUESTIONS???
2016 Winter Updates
Separation of Buildings, “Faux” Four Plex, Zero Lot Lines, Duplex Party Walls, etc.
“Separation Walls”
Which is Which?

• Separate exterior walls sharing common footing

• Zero Lot Line Unit Separation
  (Dual Ownership: Twin Home vs Condo Agreement)

• Dwelling Unit Separation “Party Wall” with single ownership
Separation of Buildings Using a Shared Footing 4-Plex and “Faux 4-Plex”
Multi Unit Bldgs Have Been Around A Long Time
So You Want To Build a 4-Plex?
Or Any # plex for that matter
320.04 (6) – Dwelling Separations

Normally, for 3 or more attached dwelling units, the Commercial Building Code (CBC) applies. Attached means some construction (other than footings and their bearing material) is shared by the units.
Fire Sprinklers Required for 3 Units or Greater by Commercial Code

SPS 321.095 Automatic fire sprinklers. (2) (a) The requirements of NFPA 13D sections 6.3 (4), 8.1.3 and 8.6 are not included as part of this code.
Separated Buildings

Where 3 or more adjacent but unattached dwelling units are each built with the outside walls that comply with the Uniform Dwelling Code (UDC), the UDC applies throughout and the CBC does not apply, even if those outside walls are adjacent to or adjoin each other.
Party Wall

Two Exterior Walls On Shared Footing

Party Wall
Separated Buildings

Building Separation

Dwelling Unit Separation

Dwelling 3 (Single)
Dwelling 2 (Duplex)
Dwelling 1 (Duplex)

Detail A
Separated Buildings

If flashing is added over the top of two such adjoining walls, the UDC would still apply.

Joint may be covered with non-structural components

- Flashing
- Soffits – Fascia
- Siding
SPS 320.04(6) SEPARATED BUILDINGS. For a building to be considered a separate single-family dwelling or a separate 2-family dwelling within the scope of this code, regardless of ownership or occupancy arrangements, all of the following conditions shall be met:

(a) No structural members other than a common footing may be shared between any 2 dwellings.

Note: Two separated, insulated foundation walls may share the same structural footing.
Separated Buildings

(b) The adjoining exterior walls of the separate dwellings shall each have exterior coverings meeting the requirements of s. SPS 321.24.

(c) The adjoining exterior walls, including foundations, of the separate dwellings shall each meet the energy requirements under ch. SPS 322, irrespective of any adjacent dwelling.
(d) Both sides of any 2 adjoining walls, floors, ceilings and attics between dwellings shall meet the dwelling separation requirements of s. SPS 321.08 (1) for 2 dwellings on the same property less than 5 feet apart.
Separated Buildings

Note: 1. Flashing is acceptable to connect the roofs between dwelling units. See appendix for further information.

2. A building of 3 or more dwelling units without the separations specified in this section is a commercial building and shall meet the requirements set forth in chs. SPS 361 to 366.
Non-structural flashing permitted

Independent Roof Systems

Separate exterior wall fire rated per s. SPS 321.08 (1) and insulated per ch. 322.
Separate exterior covering per s. SPS 321.24

Independent Floor System

Dwelling 2
(Duplex)
Separate Insulated Foundation Wall

Dwelling 1
(Duplex)
Separate Insulated Foundation Wall

Shared Footing OK

Detail A
SPS 321.08 Fire Separation

Dwelling units shall be separated from garage spaces, accessory buildings, property lines and other dwelling units

See Table 321.08

In 2-family dwellings, units shall be separated from each other and from shared tenant spaces including attics, basements, garages, vestibules and corridors
### Table 321.08

<table>
<thead>
<tr>
<th>Between Dwelling And:</th>
<th>Distance Between Objects¹</th>
<th>Fire Rated Construction²,⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detached garage or accessory building on same property</td>
<td>Less than 5 feet</td>
<td>3/4-hour wall³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/3-hour door or window³</td>
</tr>
<tr>
<td>Another dwelling on same property</td>
<td>Less than 5 feet</td>
<td>3/4-hour wall⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/3-hour door or window⁴</td>
</tr>
<tr>
<td>Detached garage, accessory building, or other dwelling on same property</td>
<td>5 to 10 feet</td>
<td>3/4-hour wall³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/3 hour door or window³</td>
</tr>
<tr>
<td>Detached garage, accessory building, or other dwelling on same property</td>
<td>More than 10 feet</td>
<td>No requirements</td>
</tr>
<tr>
<td>Property Lines</td>
<td>Less than 3 feet</td>
<td>3/4-hour wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/3-hour door or window</td>
</tr>
<tr>
<td>Property Lines</td>
<td>3 feet or more</td>
<td>No Requirements</td>
</tr>
<tr>
<td>Zero Lot Line</td>
<td>None</td>
<td>Follow sub. (2) (d) requirements</td>
</tr>
</tbody>
</table>

¹Distance shall be measured perpendicular from wall to wall or property line, ignoring overhangs.

²Fire rated construction shall protect the dwelling from an exterior fire source.

³Fire rated construction may be in either facing wall.

⁴Fire rated construction shall be in both facing walls.

⁵The methods for garage separation in par. (a) 1. are examples of ¾ hour wall construction.
Non Structural Flashing Recommended Over Gap In Roof Decking
What About “Twin Homes*”*Not a defined UDC term

Twin home looks like duplex, walks like a duplex, but doesn’t act like a duplex.

Different ownership interest for each unit and lot

Twin homes are basically half-homes with their own respective lot with a lot line landing between the two homes.

Not Twin Home You can have duplexes that have different owners but they have a condo ownership interest meaning that there is shared lot ownership.
Zero Lot Line Duplex aka “Twin Home”

Requires Two Separate Walls

Dwelling Unit separation from foundation to roof deck, exterior wall to exterior wall, and into eaves consisting of:
- 5/8” Type “X” gypsum wallboard,
- 2 layers ½” gypsum wallboard,
- or, equivalent layers on each side of the wall

Unit Separation per DSPS 321.08 (2) (d) as referenced in Table 321.08
Zero Lot Line Duplex

“Lot” Line

Double Wall Required per 321.08 (2)(d) for Zero Lot Line

Single Wall OK for Condo Separation or Single Ownership Duplex

Property Line
Duplex Party Wall Separation

Single Ownership

321.08(2)(b) Dwelling Unit Attic Separation

Dwelling Unit separation from foundation to roof deck
Type “X”
5/8" gypsum wallboard or equivalent on each side of the wall

A Single Wall

METHOD #1
DSPS 321.08 (2) (b) 1.
Duplex Party Wall Separation

Attic draft stopping in line with unit separation
- 3/8" wood structural panel
- 1/2" gypsum board

5/8-inch type "X" gypsum ceiling

Dwelling Unit separation from foundation to ceiling
Type “X”
- 5/8" gypsum wallboard or equivalent on each side of wall

Duplex Side one

Duplex Side two

Single Ownership

METHOD #2
DSPS 321.08 (2) (b) 2
Show Wall Detail On Plans

Double Wall Required per 321.8 (2)(d) for Zero Lot Line Dual Ownership

Single Wall OK for Condo Separation or Single Ownership Duplex

From Footing to Roof Deck
Because... It’s Effective
Because... It’s Effective
Questions?

Lenny Kanter
UDC Engineering Consultant
Department of Safety and Professional Services
608 261 6541
robert.kanter@wi.gov
Erosion Control Refresher
Back By Popular Demand
(And Necessity)
SPS 321.126 is repealed.

SPS 321.126 Storm water management. Storm water management practices shall be employed in accordance with s.NR 151.12 and maintained when the land disturbing construction activity involves one or more acres.

REPEALED
SPS 321.126 is repealed.

Note: Authority over storm water management at construction sites, including all authority for all the requirements in this section, was consolidated within the Department of Natural Resources (DNR) under 2013 Wis. Act 20, sections 2088 and 2089.

Consequently, the Department of Safety and Professional Services no longer administers the requirements in this section. Information regarding the DNR permit requirements and standards may be available at http://dnr.wi.gov/topic/stormwater/construction.
DNR Website
Storm water staff:
Choose the region in which your facility/site/municipality is located, or scroll down for the full list of Storm Water Staff.
Maintain ESC Measures Till Stabilization
Maintain ESC Measures Till Stabilization
Maintain ESC Measures Till Stabilization
Overall  FAIL
Erosion Control Measures Must Be Maintained
Inlet Protection
DNR Tech St. (1060)
FIGURE 1. INLET PROTECTION TYPES A, B, C AND D

NOTES:

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.

2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.

3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.

4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.

5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2"x4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

INLET PROTECTION TYPE A

INLET PROTECTION TYPE B WITHOUT CURB BOX

INLET PROTECTION TYPE C WITH CURB BOX

INLET PROTECTION TYPE D CAN BE INSTALLED IN INLETS WITH OR WITHOUT CURB BOXES

MAINTENANCE NOTES:

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.
Rock access shall be non-tracking, MIN 3 IN, DIAM. CLEAN STONE, min. 12 in depth, 50 ft min. length, width of egress
Tracking FAIL
Properly Spaced Silt Fence

Silt Fence

DNR Tech Std (1056)

Properly Spaced Silt Fence
<table>
<thead>
<tr>
<th>Slope</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 2%</td>
<td>100 feet</td>
</tr>
<tr>
<td>2 - 5%</td>
<td>75 feet</td>
</tr>
<tr>
<td>5 - 10%</td>
<td>50 feet</td>
</tr>
<tr>
<td>10 - 33%</td>
<td>25 feet</td>
</tr>
<tr>
<td>33 - 50%</td>
<td>20 feet</td>
</tr>
<tr>
<td>&gt; 50%</td>
<td>not allowed</td>
</tr>
</tbody>
</table>
Silt Fence
Code Compliant Materials Only
Must Meet WisDOT WDNR Specifications
Where to Use

- Down slope of *small* disturbed areas
- With ends extended upslope
- With room for water to pond behind the fence
- In parallel lines on long or steep slopes, along the contour
- **NOT** on slopes greater than 50% (2:1)
- **NOT** across channels or gullies
- May **NOT** be installed below the ordinary high watermark or placed perpendicular to flow in streams, swales, or ditches
Where to Use

- Down slope sides of small disturbed areas
- In parallel lines on long or steep slopes, along the contour
- NOT across channels or gullies
- NOT in streams or ditches
Ditch Checks/Erosion Mat
DNR Tech Std (1062/1053)

Constructed in ditches to reduce runoff velocity and trap sediment

Ditch checks placed at every 2ft of drop
Channel Protection
FAIL
Channel Protection
FAIL
Vegetated Buffer Criteria Tech Std. (1054)

- Disturbed area draining to buffer $\leq 6\%$
- Width of buffer slopes $< 5\%$
- Buffer width **25-ft minimum** for up to 125 feet of disturbed area. Add an additional foot of buffer for every 5 feet exceeding 125 feet of disturbed area
Manufactured Perimeter Control and Slope and Interruption Products

Straw Wattle
Approved as Ditch Checks on the DOT’s product acceptability list (PAL)

OR

Approved by S & B based on test results performed by an approved testing facility

Specific installation requirements based on height of product, degree and length of slope
Maintain ESC Measures Till Stabilization
Maintain Ground Contact
Installation Stipulations for Approved Products

Manufactured Perimeter Control and Slope Interruption Products (1071)

Installation for higher risk of run off

- Flow
- Upslope stake to create downward pressure
- Silt Sock
- Downslope staking to prevent movement
- WORK AREA
- AREA TO BE PROTECTED
- Slight entrenchment
• Manufactured products must be listed on the WisDOT PAL

• Center must be lower than sides forming a weir

• Installed every 2 feet of vertical drop

• Min. top width = 2 feet in direction of slope with a max. slope of 2:1

• Stone checks constructed of angular stone with a $D_{50}$ of 3” or greater (breaker run/shot rock)
Silt Fence?  Matting?  Or Both?
Someone’s Done Their Homework Here

It Can Be Done
## WisDOT Guidance Table

**Erosion Control Product Acceptability List “PAL”**

### CHANNEL EROSION CONTROL MATRIX

#### SLOPE EROSION CONTROL MATRIX

|-------------------------------|-------------------|

<table>
<thead>
<tr>
<th>TYPE OF EROSION CONTROL</th>
<th>6:1 or flatter (7)</th>
<th>4:1</th>
<th>3:1</th>
<th>2.5:1</th>
<th>2:1</th>
<th>1:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed with properly anchored mulch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single netted light duty (WisDOT Class I Type A) erosion mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light duty single netted 100% biodegradable (WisDOT Urban Type A) erosion mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use only 100% biodegradable anchors for urban mats.</td>
<td></td>
</tr>
<tr>
<td>Light duty double netted 100% biodegradable (WisDOT Urban Type B) erosion mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Use only 100% biodegradable anchors for urban mats.</td>
<td></td>
</tr>
<tr>
<td>Bonded Mulch (WisDOT Type A Soil Stabilizer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May be applied over Class III Type B, C, or D mats in place of erosion control revegetation mats.</td>
<td></td>
</tr>
<tr>
<td>Polymer (WisDOT Type B Soil Stabilizer)</td>
<td>Used in conjunction with other BMPs effective up to a 2:1 slope. Not effective in sand. When used alone effective up to a 3:1 slope. Stand alone use appropriate for earthen stock piles, temporary, and late season applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Double netted light duty (WisDOT Class I Type B) erosion mat</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sod</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium duty coconut erosion mat (WisDOT Class II Type B or C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sod reinforced with a double netted jute (WisDOT Class II Type A) erosion mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sod stakes required. Two bid items needed.</td>
<td></td>
</tr>
<tr>
<td>Heavy duty synthetic erosion control revegetation mat (WisDOT Class III Type A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Germination may be a problem with Class III Type A mats</td>
<td></td>
</tr>
<tr>
<td>Riprap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Angle of repose must be considered, see FDM Chapter 13.</td>
<td></td>
</tr>
<tr>
<td>Heavy duty synthetic turf reinforcement (WisDOT Class III Type B or C) mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A soil stabilizer or ECRM will be required for initial erosion protection.</td>
<td></td>
</tr>
<tr>
<td>Heavy duty synthetic turf reinforcement (WisDOT Class III Type D) mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A soil stabilizer or ECRM will be required for initial erosion protection.</td>
<td></td>
</tr>
<tr>
<td>Slope paving or grouted riprap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Consider clear zone requirements. Only use in limited circumstances such as overflow areas near bridges.</td>
<td></td>
</tr>
</tbody>
</table>
Inspector’s Role

Enforcement And Education

Provide staff and contractors with a clear understanding of basic ESC concepts.
Thank you for attending the 2016 Winter Updates presentation. We hope you found the information valuable.

Please feel free to submit feedback regarding this presentation at the following link:

https://www.surveymonkey.com/s/industryservicesspeakingevent