

Manufactured Housing Mechanic Certification Training





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CEO



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Course Information

This course has been developed by the Department of State for training credit as follows:

3 hours, Manufactured Housing – Mechanic, Webinar

Course number: mfg000????
Course provider: MHC Consultants

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Course Attendance Issues

The Division of Building Standards and Codes cannot give course attendees credit for a course without the meeting the required milestones:

Arriving more than 15 minutes after training start time,
leaving before the training end time,
missing more than 15 minutes of training time(out of room, ie:phone call),
or failing to successfully complete a required quiz, if applicable.

This course is heavy in code content.

Why am I here?

- To complete your certification training as a mechanic.

When is certification necessary?



Why am I here?

- To complete your certification training as a mechanic.

When is certification necessary?

- 19NYCRR1210.03(c) "no manufactured home shall be serviced...unless at least one person **certified** by the DOS as an **installer** or as a **mechanic** is present at the home site during the service. The presence of a person holding a limited certification...during the service shall be deemed to satisfy this requirement..."

SERVICE: The modification, alteration or repair of the structural systems of a manufactured home

Why am I here?

Open book quiz follows training

- To complete your certification training as a mechanic.

When is certification necessary?

- 19NYCRR1210.03(c) "no manufactured home shall be serviced...unless at least one person **certified** by the DOS as an **installer** or as a **mechanic** is present at the home site during the service. The presence of a person holding a limited certification...during the service shall be deemed to satisfy this requirement..."

SERVICE: The modification, alteration or repair of the structural systems of a manufactured home

Structural Systems of Manufactured Home?

- The load-resisting sub-system of the structure.
 - Framing/floor/wall systems
 - Trusses/roof system
 - Drywall Panels (Polyvinyl acetate (PVA) adhesive)
 - Sheathing Panels (Polyvinyl acetate (PVA) adhesive)
 - Shear walls
 - Chassis
 - Foundation

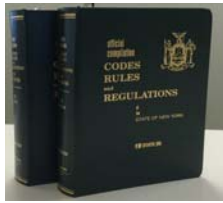
When do I need a permit?

- A permit is required for work that must comply with the Uniform Code.
 - Removal or changes to a load bearing wall
 - Removal or changes to a load bearing beam
 - Removal, relocation or change in the exit path
 - Enlargement, alteration, replacement or relocation of any building system (electrical, mechanical, structural)

How do I get a Building Permit?

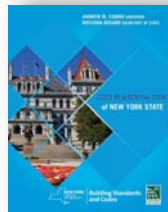
- Contact the local Code Enforcement Official for the town in which your doing the work – only one that can issue
- Insurance Certificates, plans, sketches, etc. are required to complete the application.

NYSUFBC



NYSUFBC

- The Residential Code of New York State
 - Appendix E 'Manufactured Housing'
- Regulations for -
- Installation
 - Additions
 - Alterations
 - Connection to services



Regulation: AE RCNY

Starts with the Scope...

Provisions applicable only to a manufactured home used as a **single dwelling unit** and covers

1. Construction, alteration & repair of foundation system necessary for installation
2. Installation, alteration, repair or maintenance of building service equipment necessary (water, fuel, power & sewage systems)
3. Alterations, additions repairs or relocation of existing manufactured homes

Definitions: Manufactured Home

- A home bearing a seal signifying conformance to the design and construction requirements of Department of Housing and Urban Development (HUD), Manufactured Home Construction and Safety Standards, 24 CFR Part 3280.



Definitions: Mobile Home

- A home constructed in a factory prior to June 15, 1976, with or without a label certifying compliance with NFPA, ANSI or a specific standard... For the purpose of these provisions, a mobile home shall be considered a manufactured home.



Definitions: Modular Home

- Factory manufactured dwelling units conforming to applicable provisions of this code and bearing the insignia of approval issued by the Secretary of State of New York State.



Applicability of Part 1210 & Appendix E



Mobile and
Manufactured Homes:
YES



New York State
Modular Homes:
NO

More Definitions: Addition

- An extension or increase in floor area, number of stories or height of a building or structure.



More Definitions: Alteration

- Any construction or renovation to an existing structure other than repair or addition
Such as:

More Definitions: Alteration

- Any construction or renovation to an existing structure other than repair or addition
Such as:
 - Removal or changes to a load bearing wall
 - Removal or changes to a load bearing beam
 - Removal, relocation or change in the exit path
 - Enlargement, alteration, replacement or relocation of any building system (electrical, mechanical, structural)

More Definitions: Repair

- The restoration to good or sound condition of any part of an existing building for the purpose of its maintenance.
Such as:
 - Patching or restoration of materials, elements, equipment or fixtures for the purposes of maintaining such...in good or sound condition

An Addition or Alteration?



An Addition or Alteration?? Let's look at the definitions



An Addition or Alteration?? Let's look at the definitions

ALTERATION [B]. Any construction or renovation to an existing structure other than repair or addition

Such as:...

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ADDITION [B]. An extension or increase in floor area, number of stories or height of a building or structure.

BOTH

Two More Definitions:

- **ACCESSORY BUILDING.** Any building or structure, or portion thereto, located on the same property as a manufactured home which does not qualify as a manufactured home as defined herein.

Two More Definitions:

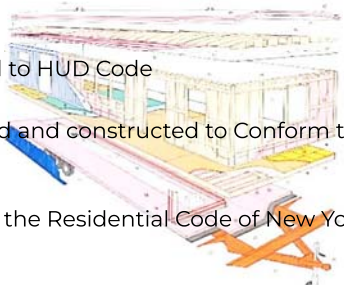
- **ACCESSORY BUILDING.** Any building or structure, or portion thereto, located on the same property as a manufactured home which does not qualify as a manufactured home as defined herein.
- **RELOCATION.** Relocated buildings include any building or structure which is relocated from its existing foundation to a new foundation.

Two More Definitions:

- **ACCESSORY BUILDING.** Any building or structure, or portion thereto, located on the same property as a manufactured home which does not qualify as a manufactured home as defined herein.
- **RELOCATION.** Relocated buildings include any building or structure which is relocated from its existing foundation to a new foundation.

Do not worry, there will be more definitions. 😊

Additions Compliance
AE 102.2



- Be Certified to HUD Code
- Be designed and constructed to Conform to HUD Code
- Conform to the Residential Code of New York

Additions Compliance

AE102.2.1

- Building additions and accessory structures shall not be structurally supported by the manufactured home.

Exception: Building additions and accessory structures supported by a manufactured home shall be in accordance with designs provided by the home manufacturer or with designs prepared by a registered design professional in accordance with acceptable engineering practice.

So, can you?



So, can you?

YES

Structurally Independent



DAPIA Approval (New Home)
 Designed by licensed design professional (Existing Home)

Various concerns addressed





**Alteration and Repair Compliance
AE102.3**

- Alterations and repairs may be made to any MH or its building service equipment without requiring the existing MH or its equipment to comply with all the requirements of these provisions provided that the alteration or repairs conforms to Appendix J of this code.

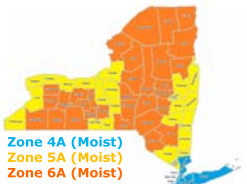
**Alteration and Repair Compliance
AE102.3.1**

- Alterations or repairs to an existing manufactured home that are nonstructural and do not adversely affect any structural member or any part of the building or structure having required fire protection may be made with materials equivalent to those of which the manufactured home structure is constructed.

Exception: The installation and/or replacement of glass shall be in conformance with fenestration rating requirements for new installations.

**Alteration and Repair Compliance
AE102.3.1**

Exception: ...fenestration rating requirements for new installations.



(b) Table N1102.1.2 (R402.1.2) of the 2020 RCNYS shall be:

[NY] TABLE N1102.1.2 INSULATION AND FENESTRATION REQUIREMENTS					
CLIMATE ZONE	FENESTRATION U-FACTOR ^b	SKYLIGHT U-FACTOR ^b	GLAZED FENESTRATION SHGC ^{c, 4}	CEILING R-VALUE	FR ⁴
4	0.32	0.55	0.40	49	20
5	0.30	0.55	NR	49	20
6 Option 1	0.30	0.55	NR	49	20+3
6 Option 2	0.28	0.55	NR	60	2

NR = Not Required.

**Existing Buildings and Structures
Appendix J101**

- Scope:** The provisions of this appendix shall apply to the repair, alteration, change of occupancy, addition and relocation of existing buildings.

- Intent:** "...to encourage the continued use or reuse of legally existing buildings and structures.

...to permit work in existing building that is consistent with the purpose of the Residential Code.

AJ104 Energy Efficiency

- Additions, alterations...to an existing building, building system or portion thereof shall conform to §N1107 (Energy Efficiency, Existing Buildings – General) without requiring the unaltered portions of the existing building or system to comply with this chapter.
- Any non-conditioned space that is altered to become conditioned space shall comply with provisions for an addition

AJ105 Preliminary Meeting

- The Building Official is authorized to require the prospective applicant meet to discuss plans for the proposed work, prior to the issuance of a permit in order to establish the specific applicability of the provisions of this appendix.

AJ106 Evaluation of Existing Bldg

- The Building Official is authorized to require an existing building be evaluated by a reg. design professional based upon the circumstances agreed upon at the preliminary meeting to determine code compliance.

AJ301 Classification of work

- The work performed to an existing building shall be classified in accordance with this Sections AJ301.3 - AJ301.10
- AJ301.2 the work area shall be identified...

WORK AREA: That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this appendix.

AJ301 Classification of work

- AJ301.3 Repairs
- AJ301.4 Alterations – Level 1
- AJ301.5 Alterations – Level 2
- AJ301.6 Change of occupancy
- AJ301.7 Additions
- AJ301.8 Historic Buildings
- AJ301.9 Relocated Buildings
- AJ301.10 Replacement

AJ301 Classification of work

- AJ301.3 Repairs §AJ401 Repairs
- AJ301.4 Alterations – Level 1 §AJ501 Alterations - Level 1
- AJ301.5 Alterations – Level 2 §AJ601 Alterations - Level 2
- AJ301.6 Change of occupancy §AJ701 Change of Occupancy
- AJ301.7 Additions §AJ801 Additions
- AJ301.8 Historic Buildings §AJ901 Historic Bldgs.
- AJ301.9 Relocated Buildings §AJ1001 Relocated Bldgs.
- AJ301.10 Replacement §AJ1101 Replacement Bldgs.

AJ401 Repairs

- Repairs to existing buildings shall comply with this section

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- Repairs shall be done in a manner that maintains the level of fire protection provided

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- Work shall be done using materials permitted by the code for new construction or using like materials such that no hazard to life, health or property is created.
- Repairs shall be done in a manner that maintains the level of fire protection provided
- Repairs shall NOT reduce the structural strength or stability of the structure

AJ401 Repairs

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- Mechanical and Plumbing repairs shall be permitted in the same manner and arrangement as the existing, provided such repairs or replacement are not hazardous and are approved.

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- Mechanical and Plumbing repairs shall be permitted in the same manner and arrangement as the existing, provided such repairs or replacement are not hazardous and are approved.
- Electrical repairs shall be permitted with like materials with a few exceptions.
 - ie: replacement electrical receptacles shall comply with NFPA 70

Alterations

- §AJ501 Alterations - Level 1
- §AJ601 Alterations - Level 2



AJ501 Alterations - Level 1

- Include the removal and replacement of the covering or existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that serve the same purpose, without reconfiguring the space.

AJ501 Alterations - Level 1

- Include the removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment or fixtures that serve the same purpose, without reconfiguring the space.
- An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing condition.

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- An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing condition.
- All new work shall comply with the materials and methods requirements of this code

AJ501 Alterations - Level 1

- Alterations shall be done in a manner that maintains the level of fire protection provided

AJ501 Alterations – Level 1

- Alterations shall be done in a manner that maintains the level of fire protection provided
- Smoke and CO alarms shall be provided as required for new.
 - Where interior wall or ceiling finishes are not removed to expose the structure hard wire interconnection is not required

AJ501 Alterations – Level 1

- Alterations shall be done in a manner that maintains the level of fire protection provided
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- Structural roof components shall be capable of supporting the roof covering system and the material loads

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- Smoke and CO alarms shall be provided as required for new.
 - Where interior wall or ceiling finishes are not removed to expose the structure hard wire interconnection is not required
- Structural roof components shall be capable of supporting the roof covering system and the material loads
- Mechanical, Plumbing and Electrical systems shall comply with the appropriate sections of this code

AJ501 Alterations - Level 1

- Reroofing shall be in accordance with §R908

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- Replacement of damaged/rusted/deteriorated flashings, edges, outlets, vents or etc.

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- Installation per roofing manufacturers installation instructions

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- No more than 2 layers of roofing material
- Replacement of water soaked/deteriorated support materials
- Replacement of damaged/rusted/deteriorated flashings, edges, outlets, vents or etc.
- Installation per roofing manufacturers installation instructions
- Additional requirements based on various material types in RCNYS Chapter 9

AJ501 Alterations - Level 1

- In *flood hazard area*, alterations that constitute *substantial improvement* shall require the building comply with §R322 (Flood-Resistant Construction) of this code.

Another Definition

- In *flood hazard area*, alterations that constitute *substantial improvement* shall require the building comply with §R322 (Flood-Resistant Construction) of this code.

FLOOD HAZARD AREA: The greater of the following two areas:
 1. The area within a flood plain subject to a 1% or greater chance of flooding in any year

Another Definition

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FLOOD HAZARD AREA: The greater of the following two areas:
 1. The area within a flood plain subject to a 1% or greater chance of flooding in any year
 2. The area designated as a flood hazard area on a communities flood hazard map, or otherwise legally designated.

More Related Definitions

SUBSTANTIAL IMPROVEMENT: ...any repair, alteration, addition or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed.

More Related Definitions

SUBSTANTIAL IMPROVEMENT: ...any repair, alteration, addition or improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed.

SUBSTANTIAL DAMAGE: ...damage of any origin...cost of restoration to before-damage condition would equal or exceed 50% of market value before damage occurred

R322 Flood Resistant Construction

- R322.1.9 The bottom of the frame of new and replacement manufactured homes...shall be elevated to or above the elevations specified in R322.2 or R322.3. The anchor and tie-down requirement of the applicable state or federal requirements shall apply. The foundation and anchorage of manufactured homes to be located in identified floodways shall be designed and constructed in accordance with ASCE 24 (American Society of Civil Engineers [ASCE] 24 – Flood Resistant Design and Construction)

R322 Flood Resistant Construction

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R322 Flood Resistant Construction

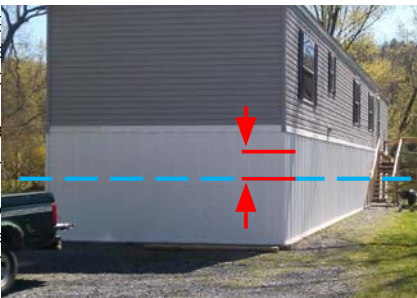
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AJ601 Alterations - Level 2

- Include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.
- Comply with the requirements of this section and

AJ601 Alterations - Level 2

- Include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.
- Comply with the requirements of this section and
- Additionally comply with the requirements of section AJ501

AJ601 Alterations - Level 2

- Include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.
- Comply with the requirements of this section and
- Additionally comply with the requirements of section AJ501
- All newly constructed elements, components, systems and spaces shall comply with the requirements of this code

AJ601 Alterations – Level 2

- The work performed shall not increase or create a nonconformity with the code requirements

AJ601 Alterations – Level 2

- The work performed shall not increase or create a nonconformity with the code requirements
- Where the work area exceeds 50% of the area of the dwelling, the interior finish of walls and ceilings in the work area shall comply with §R302.9 (Flame spread and smoke-developed index for wall and ceiling finishes)
 - Remove and replace or treat with approved fire retardant coating

AJ601 Alterations – Level 2

- The work performed shall not increase or create a nonconformity with the code requirements
- Where the work area exceeds 50% of the area of the dwelling, the interior finish of walls and ceilings in the work area shall comply with §R302.9 (Flame spread and smoke-developed index for wall and ceiling finishes)
 - Remove and replace or treat with approved fire retardant coating
- Smoke and CO alarms shall be provided as required for new.
 - Where interior wall or ceiling finishes are not removed to expose the structure hard wire interconnection is not required

AJ601 Alterations - Level 2

- Structural components shall be capable of supporting existing structure loads and the new increased loads combined

AJ601 Alterations - Level 2

- Structural components shall be capable of supporting existing structure loads and the new increased loads combined
- No reduction in structural strength or stability of the structure

AJ601 Alterations - Level 2

- Structural components shall be capable of supporting existing structure loads and the new increased loads combined
- No reduction in structural strength or stability of the structure
- New structural members shall comply with this code
 - Inc. connections and anchorage

AJ601 Alterations – Level 2

- Structural components shall be capable of supporting existing structure loads and the new increased loads combined
- No reduction in structural strength or stability of the structure
- New structural members shall comply with this code
 - Inc. connections and anchorage
- Mechanical, Plumbing and Electrical systems shall comply with the appropriate sections of this code

This is a small snap shot of some of the code requirements for alterations.

AJ801 Additions

- Comply with the *requirements of this section* and appropriate sections for new construction

AJ801 Additions

- Comply with the *requirements of this section* and appropriate sections for new construction
- Expect where required, unaltered portions of the existing building shall not be required to comply with this code

AJ801 Additions

- Comply with the requirements of this section and appropriate sections for new construction
- Expect where required, unaltered portions of the existing building shall not be required to comply with this code
- Shall not create or extend any nonconformity in the existing building

AJ801 Additions

- Comply with the requirements of this section and appropriate sections for new construction
- Expect where required, unaltered portions of the existing building shall not be required to comply with this code
- Shall not create or extend any nonconformity in the existing building
- Smoke and CO alarms shall be provided as required for new.
 - Where interior wall or ceiling finishes are not removed to expose the structure hard wire interconnection is not required

AJ801 Additions

- If the addition and all other proposed/associated work, when combined, constitute substantial improvement, the existing building and the addition shall comply with §R322 of this code

AJ801 Additions

- If the addition and all other *proposed*/associated work, when combined, constitute substantial improvement, the existing building and the addition shall comply with §R322 of this code

Remember - **SUBSTANTIAL IMPROVEMENT:** value which equals or exceeds 50% of market value of structure before the improvement

AJ801 Additions

- If the addition and all other *proposed*/associated work, when combined, constitute substantial improvement, the existing building and the addition shall comply with §R322 of this code

Remember - **SUBSTANTIAL IMPROVEMENT:** value which equals or exceeds 50% of market value of structure before the improvement

- Additions to Mechanical, Plumbing & Electrical shall comply to with the appropriate sections of this code for new systems

Foundation Repairs

- Manufacturer's Installations Instructions
- If not available



Foundation Repairs

- Manufacturer's Installations Instructions
- If not available
 - HUD Model Installation Standard (24-CFR-3285, 2016)



Foundation Repairs

- Manufacturer's Installations Instructions
- If not available
 - HUD Model Installation Standard (24-CFR-3285, 2016)
 - NFPA 225 (2017) Manufactured Home Installation \$\$\$



Foundation Repairs

- Utilizing HUD Model Installation Standard
 - 24-CFR-3285, 2016
- <https://www.gpo.gov/fdsys/pkg/CFR-2016-title24-vol5/pdf/CFR-2016-title24-vol5-part3285.pdf>

Foundation Repairs

- Utilizing HUD Model Installation Standard
 - 24-CFR-3285, 2016
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Foundation exercise:
HUD Model Installation Standard

Foundation Repairs

- Find the Manufacturer’s Design Data!
 - Wind Zone Design
 - Replacement or Installation of Anchoring
 - Snow Load Data
 - Replacement or Installation of Piers/Footings
 - Heating/Cooling Certificate

New York State - Non-Hurricane Zone 1

Manufactured Homes are constructed and installed to prevent overturning, uplift, and lateral movements due to wind loads.

The home and anchoring equipment must resist:
Horizontal forces of 15psf
Uplift forces of 9psf



New York State Snow Zones – HUD Code

30 psf Zone by County

- St. Lawrence, Franklin
- Clinton, Essex, Hamilton
- Warren, Herkimer, Lewis
- Oswego, Jefferson, Oneida
- Fulton, Onondaga, Madison
- Cayuga, Seneca, Wayne
- Ontario, Genesee, Orleans
- Niagara, Erie, Wyoming
- Monroe, Saratoga, Yates
- Washington, Montgomery
- Schenectady, Livingston



New York State Snow Zones – HUD Code

30 psf Zone by County

- St. Lawrence, Franklin
- Clinton, Essex, Hamilton
- Warren, Herkimer, Lewis
- Oswego, Jefferson, Oneida
- Fulton, Onondaga, Madison

Roof load zone:

- Niagara, Erie, Wyoming
- Monroe, Saratoga, Yates
- Washington, Montgomery
- Schenectady, Livingston



New York State Snow Zones – HUD Code

30 psf Zone by County

- St. Lawrence, Franklin
- Clinton, Essex, Hamilton
- Warren, Herkimer, Lewis
- Oswego, Jefferson, Oneida
- Fulton, Onondaga, Madison

Roof load zone:

Middle, 30 psf

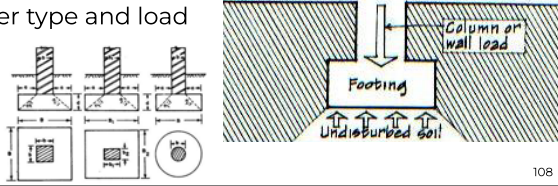
- Monroe, Saratoga, Yates
- Washington, Montgomery
- Schenectady, Livingston



Foundation Repairs

Install new or replacement piers or footings

- Footing sizes depend upon two other factors
 - Soil bearing capacity
 - Pier type and load



Foundation Repairs – Soil capacity

Soil bearing capacity must be determined (§3285.202)

- Soil tests in accordance with accepted engineering practice

Foundation Repairs – Soil capacity

Soil bearing capacity must be determined (§3285.202)

- Soil tests in accordance with accepted engineering practice
- Soil records of LAHJ

Foundation Repairs – Soil capacity

Soil bearing capacity must be determined (§3285.202)

- Soil tests in accordance with accepted engineering practice
- Soil records of LAHJ
- Visual Identification, if testing cannot determine, values shown in Table §3285.202

Foundation Repairs – Soil capacity

Soil bearing capacity must be determined (§3285.202)

- Soil tests in accordance with accepted engineering practice
- Soil records of LAHJ
- Visual Identification, if testing cannot determine, values shown in Table §3285.202

TABLE TO § 3285.202

Class Number	Soil description	Alternative soil bearing pressure (psf) ¹	Soil class	Torque probe ² value ³ (psi) (lb/ft ²)
1	Rock or hard pan	4000 +		
2	Sandy gravel and gravel, very fine to medium	2000	40 +	More than 500
3	Sandy coarse to medium sand, silty sand, clean sand, silty sand, medium dense coarse sand, sand/gravel, and very stiff silty sand	1500	24-39	301-450
4A	Loose to medium dense sandy firm to stiff clay and silty clay	1000	18-23	270-360
4B	Loose to medium dense silty clay, silty clay, and silty clay	1000	13-17	170-270
5	Loose to medium dense silty clay, silty clay, and silty clay	1000	10-11	Less than 170

¹The values provided in this table have not been adjusted for overburden pressure, embedment depth, water table height, or settlement potential.
²The probe classified as CH or MH, without other torque probe values or blow count test results, selected anchors must be used for a 40 psi.
³The torque probe is a device for measuring the torque value of soils to assist in evaluating the bearing capacity of the soil in which the ground anchor is placed. The soil must be of adequate length for the full sweep of the ground anchor.
⁴The torque value is a measure of the load resistance provided by the soil when subject to the torsion or twisting force of the probe.

Foundation Repairs – Soil capacity, continued

Soil bearing capacity must be determined

- In lieu of determining soil bearing capacity,
 - presumptive allowable capacity 1,500 psf may be used
 - Unless site-specific information requires use of a lower value

Foundation Repairs – Soil capacity, continued

Soil bearing capacity must be determined

- In lieu of determining soil bearing capacity,
 - presumptive allowable capacity 1,500 psf may be used
 - Unless site-specific information requires use of a lower value
- If the soil appears to be composed of peat, organic clays, uncompacted fill or unusual conditions, a licensed design professional shall determine soil classification and maximum allowable bearing capacity.

Foundation Repairs – Soil capacity, continued

Soil bearing capacity must be determined

- In lieu of determining soil bearing capacity,
 - presumptive allowable capacity 1,500 psf may be used
 - Unless site-specific information requires use of a lower value

What is the soil bearing capacity: composed of peat, organic clays, uncompacted fill or unusual conditions, a licensed design professional shall determine soil classification and maximum allowable bearing capacity.

Foundation Repairs – Soil capacity, continued

Soil bearing capacity must be determined

- In lieu of determining soil bearing capacity,
 - presumptive allowable capacity 1,500 psf may be used
 - Unless site-specific information requires use of a lower value

What is the soil bearing capacity: composed of peat, organic clays, uncompacted fill or unusual conditions, a licensed design professional shall determine soil classification and maximum allowable bearing capacity.

Foundation Repairs – Pier location

- Location & Spacing (§3285.310, 3285.311, 3285.312)
Location and spacing depend upon the dimension of the home, live and dead loads, type of construction (single or multi), main beam size, and other factors

Foundation Repairs – Pier location

- Location & Spacing (§3285.310, 3285.311, 3285.312)
Location and spacing depend upon the dimension of the home, live and dead loads, type of construction (single or multi), main beam size, and other factors

Pier spacing will determine pier loads

Foundation Repairs – Pier location

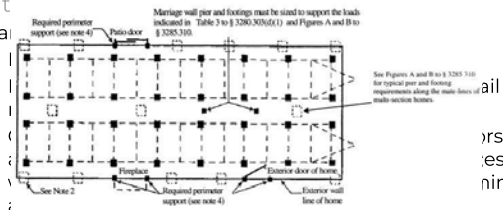
- Location & Spacing (§3285.310, 3285.311, 3285.312)
Location and spacing depend upon the dimension of the home, live and dead loads, type of construction (single or multi), main beam size, and other factors

Pier spacing will determine pier loads

Support locations and spacing must be consistent with Figures contained with standard.

Foundation Repairs – Pier location

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends

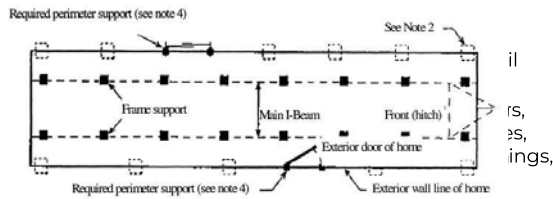


Notes: 1. Refer to Table 1 to §3285.303 for pier and footing requirements when frame blocking only is used.
 2. In addition to blocking required by §3285.311, see Tables 2 and 3 to §3285.303 for any other sidewall openings of 48 inches or greater in width. For roof loads of 40 psf or greater, a professional engineer or registered architect must determine the maximum side wall opening permitted without perimeter support.

Foundation Repairs – Pier location

Figure A to § 3285.312 Typical Blocking Diagram for Single Section Homes

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends



Notes: 1. Refer to Table 1 to §3285.303 for pier and footing requirements when frame blocking only is used.
 2. In addition to blocking required by §3285.311, see Tables 2 and 3 to §3285.303 for any other sidewall openings of 48 inches or greater in width. For roof loads of 40 psf or greater, a professional engineer or registered architect must determine the maximum side wall opening permitted without perimeter support.

Foundation Repairs – Pier location

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends

Foundation Repairs – Pier location

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends
 - Not more than 120" center to center under the main rails
 - 10" or greater main beam

Foundation Repairs – Pier location

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends
 - Not more than 120" center to center under the main rails
 - On both sides of sidewall exterior doors, patio doors, and sliding glass doors, under porch post, fireplaces, wood stoves, jamb studs at multiple window openings, and any sidewall opening greater than 48"

Foundation Repairs – Pier location

- Location & Spacing (§3285.310)
 - Frame support [Figure A: §3285.312]
 - No more than 24" from both ends
 - Not more than 120" center to center under the main rails
 - On both sides of sidewall exterior doors, patio doors, and sliding glass doors, under porch post, fireplaces, wood stoves, jamb studs at multiple window openings, and any sidewall opening greater than 48"
 - Piers may be offset up to 6" to allow for plumbing, electrical, mechanical equipment, crawlspaces or other devices.

Foundation Repairs – Pier loads

- Pier loads must be determined (§3285.303(d))

Tabular Data

- Table 1 - §3285.303: Frame blocking only, w/ perimeter openings
- Table 2 - §3285.303: Frame plus perimeter
- Table 3 - §3285.303: Ridge beam span (mating wall openings)

Foundation Repairs – Pier I

- Pier loads must be dete

Tabular Data

- Table 1 - §3285.303: Fram

What is the pier load:
8 ft. spacing per roof load
zone

TABLE 1 TO § 3285.303—FRAME BLOCKING ONLY/PERIMETER SUPPORT NOT REQUIRED EXCEPT AT OPENINGS			
Pier spacing	Roof live load (psf)	Location	Load (lbs.)
4 ft. 0 in.	20	Frame	2,900
	30	Frame	3,300
	40	Frame	3,600
6 ft. 0 in.	20	Frame	4,200
	30	Frame	4,700
	40	Frame	5,200
8 ft. 0 in.	20	Frame	5,500
	30	Frame	6,200
	40	Frame	6,900
10 ft. 0 in.	20	Frame	6,800
	30	Frame	7,600
	40	Frame	8,500

Foundation Repairs – Pier I

- Pier loads must be dete

Tabular Data

- Table 1 - §3285.303: Fram

What is the pier load:
8 ft. spacing per roof load
zone
6200 lbs.

TABLE 1 TO § 3285.303—FRAME BLOCKING ONLY/PERIMETER SUPPORT NOT REQUIRED EXCEPT AT OPENINGS			
Pier spacing	Roof live load (psf)	Location	Load (lbs.)
4 ft. 0 in.	20	Frame	2,900
	30	Frame	3,300
	40	Frame	3,600
6 ft. 0 in.	20	Frame	4,200
	30	Frame	4,700
	40	Frame	5,200
8 ft. 0 in.	20	Frame	5,500
	30	Frame	6,200
	40	Frame	6,900
10 ft. 0 in.	20	Frame	6,800
	30	Frame	7,600
	40	Frame	8,500

Foundation Repairs – Footings

- Footing materials & placement (§3285.312)
 - Materials (§3285.312(a))
 - Must provide equal load-bearing capacity
 - Resistance to decay
 - Placed on undisturbed soil
 - or
 - Compacted fill to 90% of maximum relative density

Foundation Repairs – Footings

- Footing materials & placement (§3285.312)
 - Placement in freezing climates (§3285.312(b))
 - Conventional footings below frost line depth for site

Foundation Repairs – Footings

- Footing materials & placement (§3285.312)
 - Placement in freezing climates (§3285.312(b))
 - Conventional footings below frost line depth for site
 - or
 - **Slab options not available to a Mechanic**
 - Monolithic slab system designed by a licensed design professional in accordance with engineering practice or ASCE 32.01
 - or
 - Insulated foundation designed by a licensed design professional in accordance with engineering practice or ASCE 32.01

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)
- Tabular Data
 - Table §3285.312: Size and Capacity for Unreinforced Cast-in-place Footings

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)
- Tabular Data
 - Table §3285.312: Size and Capacity for Unreinforced Cast-in-place Footings
 - Sizes shown are for square pads

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)
- Tabular Data
 - Table §3285.312: Size and Capacity for Unreinforced Cast-in-place Footings
 - Sizes shown are for square pads
 - Other configurations (rectangular or circular) are allowed
 - Area and depth shown in table must be equal to value shown
 - Distance from edge of pier to edge of footing is not less than thickness of footing

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)
- TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE FOOTINGS

Soil capacity (psf)	Minimum footing size (in.)	Ø in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,800	8	1,800	8
	20 x 20	2,600	8	2,600	8
	24 x 24	3,700	6	3,700	6
	30 x 30	5,000	8	5,000	6
	36 x 36	7,000	10	8,100	8
	42 x 42	*10,700	10	10,700	10
1,500	16 x 16	2,500	8	2,500	8
	20 x 20	4,000	8	4,000	8
	24 x 24	5,800	8	5,700	8
	30 x 30	*8,500	10	8,900	8
	36 x 36	*12,400	10	12,000	8
	42 x 42	*18,500	12	*16,800	10
2,000	48 x 48	*21,200	14	*21,600	12
	16 x 16	3,400	6	3,400	6

Foundation Repairs – Footings

- Footing size must be determined (§3285.312)
- TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE FOOTINGS

Remember:
Soil bearing:
Pier load: **same Footings**

Soil capacity (psf)	Minimum footing size (in.)	Ø in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,800	8	1,800	8
	20 x 20	2,600	8	2,600	8
	24 x 24	3,700	6	3,700	6
	30 x 30	5,000	8	5,000	6
	36 x 36	7,000	10	8,100	8
	42 x 42	*10,700	10	10,700	10
1,500	16 x 16	2,500	8	2,500	8
	20 x 20	4,000	8	4,000	8
	24 x 24	5,800	8	5,700	8
	30 x 30	*8,500	10	8,900	8
	36 x 36	*12,400	10	12,000	8
	42 x 42	*18,500	12	*16,800	10
2,000	48 x 48	*21,200	14	*21,600	12
	16 x 16	3,400	6	3,400	6

Foundation Repairs – Footings

Remember:
Soil bearing: **1500 psf.**
Pier load: **12,000 lbs.**

• Footing size must be determined
TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE MINIMUM THICKNESS

Soil capacity (psf)	Minimum footing size (in.)	8 in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,800	6	1,800	6
	20 x 20	2,600	6	2,600	6
	24 x 24	3,700	6	3,700	6
	30 x 30	5,000	8	5,800	6
	36 x 36	7,900	10	8,100	8
	42 x 42	*10,700	10	10,700	10
1,500	16 x 16	2,500	6	2,500	6
	20 x 20	4,000	6	4,000	6
	24 x 24	5,600	8	5,700	6
	30 x 30	*8,500	10	8,900	8
	36 x 36	*12,400	10	12,600	8
	42 x 42	*16,500	12	*16,800	10
48 x 48	*21,200	14	*21,800	12	
2,000	16 x 16	3,400	6	3,400	6

Foundation Repairs – Footings

Remember:
Soil bearing: **1500 psf.**
Pier load: **6200 lbs.**

• Footing size must be determined
TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE MINIMUM THICKNESS

Soil capacity (psf)	Minimum footing size (in.)	8 in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,800	6	1,800	6
	20 x 20	2,600	6	2,600	6
	24 x 24	3,700	6	3,700	6
	30 x 30	5,000	8	5,800	6
	36 x 36	7,900	10	8,100	8
	42 x 42	*10,700	10	10,700	10
1,500	16 x 16	2,500	6	2,500	6
	20 x 20	4,000	6	4,000	6
	24 x 24	5,600	8	5,700	6
	30 x 30	*8,500	10	8,900	8
	36 x 36	*12,400	10	12,600	8
	42 x 42	*16,500	12	*16,800	10
48 x 48	*21,200	14	*21,800	12	
2,000	16 x 16	3,400	6	3,400	6

Foundation Repairs – Footings

Remember:
Soil bearing: **1500 psf.**
Pier load: **6200 lbs.**

• Footing size must be determined
TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE MINIMUM THICKNESS

Soil capacity (psf)	Minimum footing size (in.)	8 in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,800	6	1,800	6
	20 x 20	2,600	6	2,600	6
	24 x 24	3,700	6	3,700	6
	30 x 30	5,000	8	5,800	6
	36 x 36	7,900	10	8,100	8
	42 x 42	*10,700	10	10,700	10
1,500	16 x 16	2,500	6	2,500	6
	20 x 20	4,000	6	4,000	6
	24 x 24	5,600	8	5,700	6
	30 x 30	*8,500	10	8,900	8
	36 x 36	*12,400	10	12,600	8
	42 x 42	*16,500	12	*16,800	10
48 x 48	*21,200	14	*21,800	12	
2,000	16 x 16	3,400	6	3,400	6

Foundation Repairs – Footings

- Footing size must be determined

Remember:
Soil bearing: **1500 psf.**
Pier load: **6200 lbs.**

TABLE TO § 3285.312—THE SIZE AND CAPACITY FOR UNREINFORCED CAST-IN-PLACE MINIMUM THICKNESS

Soil capacity (psf)	Minimum footing size (in.)	8 in. x 16 in. pier		16 in. x 16 in. pier	
		Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)	Maximum footing capacity (lbs.)	Unreinforced cast-in-place minimum thickness (in.)
1,000	16 x 16	1,600	6	1,600	6
	20 x 20	2,600	6	2,600	6
1,500	24 x 24	4,000	7	4,000	6
	30 x 30	5,500	10	5,500	8
2,000	36 x 36	12,000	10	12,000	8
	42 x 42	16,500	12	16,800	10
	48 x 48	21,200	14	21,800	12
	16 x 16	3,400	6	3,400	6

4. Concrete block piers must not exceed their design capacity of 8,000 lbs. for 8" x 16" single stack block and 16,000 lbs. for 16" x 16" double stack block.

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Foundation Repairs - Piers

- Allowable piers (§3285.303(b))
- Must be capable of transmitting vertical live and dead loads to footings
- Concrete blocks

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Foundation Repairs - Piers

- Allowable piers (§3285.303(b))
- Must be capable of transmitting vertical live and dead loads to footings
- Concrete blocks
- PT wood (Category 4B, ground contact)

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Foundation Repairs - Piers

- Allowable piers (§3285.303(b))
Must be capable of transmitting vertical live and dead loads to footings
- Concrete blocks
- PT wood (Category 4B, ground contact)
- Adjustable manufactured piers
 - Labeled w/ max load capacities

Foundation Repairs – Pier configuration

- Concrete block (§3285.304(a))
 - Load-bearing (not decorative) concrete block 8x8x16
 - Stacked with hollow cells aligned vertically
 - When double stacked each layer at 90° to the preceding layer

Foundation Repairs – Pier configuration

- Caps (§3285.304(b))
 - Solid concrete minimum 4" nominal

Foundation Repairs – Pier configuration

- Caps (§3285.304(b))
 - Solid concrete minimum 4" nominal
 - Hardwood lumber minimum 2" nominal

Foundation Repairs – Pier configuration

- Caps (§3285.304(b))
 - Solid concrete minimum 4" nominal
 - Hardwood lumber minimum 2" nominal
 - ½" thick corrosion protected steel

Foundation Repairs – Pier configuration

- Caps (§3285.304(b))
 - Solid concrete minimum 4" nominal
 - Hardwood lumber minimum 2" nominal
 - ½" thick corrosion protected steel
 - Same length and width as pier

Foundation Repairs – Pier configuration

- Gaps (§3285.304(c))

Between bottom of frame and top of pier shall be filled by:

- Shims
 - 4x6x1
 - Used in pairs, driven tightly, occupy no more than 1"

Foundation Repairs – Pier configuration

- Gaps (§3285.304(c))

Between bottom of frame and top of pier shall be filled by:

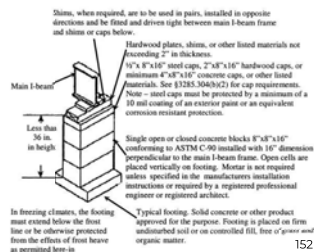
If the space to be filled is greater than 1", shims with

- Spacer
 - Hardwood plate no thicker than 2" nominal
 - Concrete block 2" or 4"

Foundation Repairs – Pier configuration

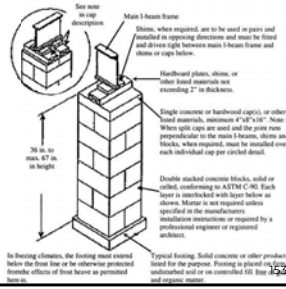
- Design procedures... (§3285.306)

- Single Stack to 36" high
 - Horizontal offset not to exceed 1/2"



Foundation Repairs – Pier configuration

- Design procedures... (§3285.306)
 - Double stack to 67" high & corner piers over 3 block high
 - Horizontal offset not to exceed 1"



Foundation Repairs – Pier configuration

- Design procedures... (§3285.306)
 - Over 67" high
 - Designed by licensed design professional













Foundation Repairs

Install new or replacement anchors or tie-downs

- The manufactured home must be secured against the wind by use of ground anchor installations or by connection to an alternative

Foundation Repairs

Install new or replacement anchors or tie-downs

- The manufactured home must be secured against the wind by use of ground anchor installations or by connection to an alternative
- All anchoring systems must be capable of meeting the loads required by 24CFR3280, Subpart D
 - §3280.306(f) Anchoring equipment shall be capable of resisting a working load equal to 3150 lbs. and a 50% overload (4725 lbs. total) without failure of equipment or attachment point

Foundation Repairs – Ground anchors

- Specifications for tie-down straps and ground anchors (§3285.402(c))
 - Must be installed in accordance with their listing or certification
 - Must be installed to their full depth
 - Appropriate for the soil type
 - Straps shall be 1 ¼"x0.035" or larger steel strapping conforming to ASTM D3953-97

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))
 - No more than 24" from end of frame
 - Spacing shall be no greater than that shown in tables and figures of this section

Or

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))
 - No more than 24" from end of frame
 - Spacing shall be no greater than that shown in tables and figures of this section

Or

Designed by licensed design professional

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))
 - No more than 24" from end of frame
 - Spacing shall be no greater than that shown in tables and figures of this section
- Or
- Designed by licensed design professional
 - Longitudinal anchors required in all wind zones.

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))

TABLE 1 TO § 3285.402—MAXIMUM DIAGONAL TIE-DOWN STRAP SPACING, WIND ZONE I

Nominal floor width, single section/multi-section	Max. height from ground to diagonal strap attachment	I-beam spacing 82.5 in.	I-beam spacing 99.5 in.
12/24 ft. 144 in. nominal section(s)	25 in	14 ft. 2 in	N/A.
	33 in	11 ft. 9 in	N/A.
	46 in	9 ft. 1 in	N/A.
	67 in	N/A	N/A.
14/28 ft. 168 in. nominal section(s)	25 in	18 ft. 2 in	15 ft. 11 in.
	33 in	16 ft. 1 in	13 ft. 6 in.
	46 in	13 ft. 3 in	10 ft. 8 in.
	67 in	10 ft. 0 in	N/A.
16/32 ft. 180 in. to 192 in. nominal section(s)	25 in	N/A	19 ft. 5 in.
	33 in	16 ft. 0 in	17 ft. 5 in.

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))

What is spacing?
 28' multi-sectional
 33" max height
 99.5" I-Beam spacing

TABLE 1 TO § 3285.402—MAXIMUM DIAGONAL TIE-DOWN STRAP SPACING, WIND ZONE I

Nominal floor width, single section/multi-section	Max. height from ground to diagonal strap attachment	I-beam spacing 82.5 in.	I-beam spacing 99.5 in.
12/24 ft. 144 in. nominal section(s)	25 in	14 ft. 2 in	N/A.
	33 in	11 ft. 9 in	N/A.
	46 in	9 ft. 1 in	N/A.
	67 in	N/A	N/A.
14/28 ft. 168 in. nominal section(s)	25 in	18 ft. 2 in	15 ft. 11 in.
	33 in	16 ft. 1 in	13 ft. 6 in.
	46 in	13 ft. 3 in	10 ft. 8 in.
	67 in	10 ft. 0 in	N/A.
16/32 ft. 180 in. to 192 in. nominal section(s)	25 in	N/A	19 ft. 5 in.
	33 in	16 ft. 0 in	17 ft. 5 in.

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))

What is spacing?
 28' multi-sectional
 33" max height
 99.5" I-Beam spacing

TABLE 1 TO § 3285.402—MAXIMUM DIAGONAL TIE-DOWN STRAP SPACING, WIND ZONE 1

Nominal floor width, single section/multi-section	Max. height from ground to diagonal strap attachment	I-beam spacing 82.5 in.	I-beam spacing 99.5 in.
12/24 ft. 144 in. nominal section(s)	25 in	14 ft. 2 in	N/A
	33 in	11 ft. 9 in	N/A
	46 in	9 ft. 1 in	N/A
14/28 ft. 168 in. nominal section(s)	25 in	N/A	N/A
	33 in	18 ft. 2 in	15 ft. 11 in.
	46 in	16 ft. 1 in	13 ft. 8 in.
	67 in	13 ft. 3 in	10 ft. 8 in.
16/32 ft. 192 in. nominal section(s)	25 in	10 ft. 0 in	N/A
	33 in	N/A	19 ft. 5 in.
	46 in	16 ft. 0 in	17 ft. 5 in.

Foundation Repairs – Ground anchors

- Number and location of ground anchors (§3285.402(d))

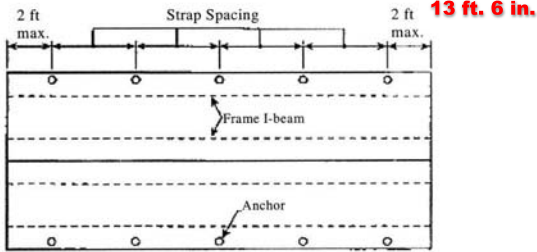
What is spacing?
 28' multi-sectional
 33" max height
 99.5" I-Beam spacing
13 ft. 6 in.

TABLE 1 TO § 3285.402—MAXIMUM DIAGONAL TIE-DOWN STRAP SPACING, WIND ZONE 1

Nominal floor width, single section/multi-section	Max. height from ground to diagonal strap attachment	I-beam spacing 82.5 in.	I-beam spacing 99.5 in.
12/24 ft. 144 in. nominal section(s)	25 in	14 ft. 2 in	N/A
	33 in	11 ft. 9 in	N/A
	46 in	9 ft. 1 in	N/A
14/28 ft. 168 in. nominal section(s)	25 in	N/A	N/A
	33 in	18 ft. 2 in	15 ft. 11 in.
	46 in	16 ft. 1 in	13 ft. 8 in.
	67 in	13 ft. 3 in	10 ft. 8 in.
16/32 ft. 192 in. nominal section(s)	25 in	10 ft. 0 in	N/A
	33 in	N/A	19 ft. 5 in.
	46 in	16 ft. 0 in	17 ft. 5 in.

Foundation

Figure A to § 3285.402 Ground Anchor Locations and Spacing – Plan View.



NOTES: 1. Refer to Tables 1, 2, and 3 to this section for maximum ground anchor spacing. 2. Longitudinal anchors not shown for clarity; refer to 3285.402(b)(2) for longitudinal anchoring requirements.

Types of Anchors



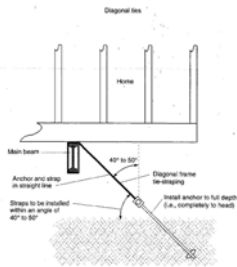
Wet Concrete "J Hook"
Anchor for use in wet
concrete. Swivel head.

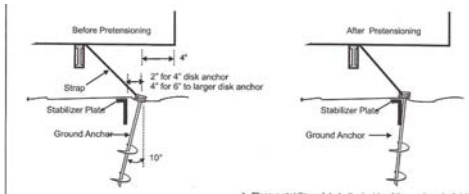


Twin Disk Anchor *For clay and
other hard soils, 3/4" rod, 30" length,
double 4' helix.



Rock Anchor Complete *For use
in hard/rocky soil.





Foundation Repairs – Minimum height

Clearance under the home (§3285.305)

- Minimum clearance of 12" must be maintained between the lowest member of the main frame and the grade under all areas of the home.

Ventilation and Condensation Control

- Crawlspace ventilation (§3285.402(d))

A crawlspace with skirting must be provided with ventilation

- Minimum net area of ventilation
 - Not less than 1 sq.ft. for every 150 sq.ft. of conditioned floor area

Ventilation and Condensation Control

- Crawlspace ventilation (§3285.402(d))

- Ventilation openings placed as high as possible above ground
- Be located on at least opposite sides to provide cross-ventilation
- Prevent entry of rodents
- Access opening not less than 18" in width and 24" in height must be provided and located so that any utility connection located under the home is accessible
- Dryer vents and combustion air inlets pass through skirting
- Water run-off from furnace, A/C or water heater must direct away from home

Ventilation and Condensation Control

- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - No Vapor Barrier
 - 1sqft vent per 150sqft floor space

Ventilation and Condensation Control

- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - No Vapor Barrier
 - 1sqft vent per 150sqft floor space
 - Need 9sqft of free vent (1296sqinches)

Ventilation and Condensation Control

- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - No Vapor Barrier
 - 1sqft vent per 150sqft floor space
 - Need 9sqft of free vent (1296sqinches)
 - Use 32" panel (13sqinches)

Ventilation and Condensation Control

Calculations: Center Vent Vinyl Skirting

- 28x48 Home = 1344sqft
- No Vapor Barrier
- 1sqft vent per 150sqft floor space
- Need 9sqft of free vent (1296sqinches)
- Use 32" panel (13sqinches)
- $1296 / 13 = 100$ panels

114 panels to skirt whole house

Ventilation and Condensation Control

- Ground moisture control (§3285.204)

If the space under the home is enclosed with skirting or other materials, a vapor retarder must be installed to cover the ground under the home.

Ventilation and Condensation Control

- Ground moisture control (§3285.204)

If the space under the home is enclosed with skirting or other materials, a vapor retarder must be installed to cover the ground under the home.

- 6 mil poly sheeting or equivalent under entire home
- Except under porches, decks, and recessed entries
- Placed under footings (slabs) or over footings placed at grade
- Any voids/tears must be repaired

Ventilation and Condensation Control

- Crawlspace ventilation (§3285.402(d))
- Area of ventilation may be reduced with installation of vapor retarder conforming to 3285.204, beneath entire conditioned floor area
 - Not less than 1 sq.ft. for every 1,500 sq.ft. of conditioned floor area

Ventilation and Condensation Control

- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - Vapor Barrier Installed
 - **1sqft vent per 1500sqft floor space**

Ventilation and Condensation Control

- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - Vapor Barrier Installed
 - 1sqft vent per 1500sqft floor space
 - Need 1sqft of free vent (144sqinches)

Ventilation and Condensation Control

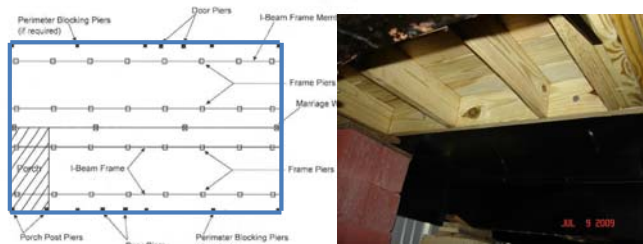
- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - Vapor Barrier Installed
 - 1sqft vent per 1500sqft floor space
 - Need 1sqft of free vent (144sqinches)
 - Use 32" panel (13sqinches)

Ventilation and Condensation Control

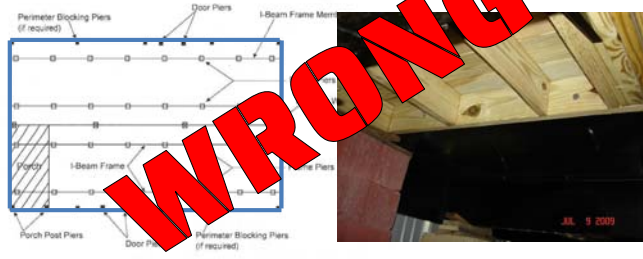
- Calculations: Center Vent Vinyl Skirting
- 28x48 Home = 1344sqft
 - Vapor Barrier Installed
 - 1sqft vent per 1500sqft floor space
 - Need 1sqft of free vent (144sqinches)
 - Use 32" panel (13sqinches)
 - $144 / 13 = 12$ panels

114 panels to skirt whole house

Skirting Installation



Skirting Installation



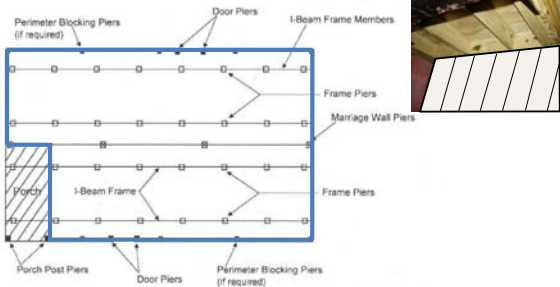
Skirting Installation

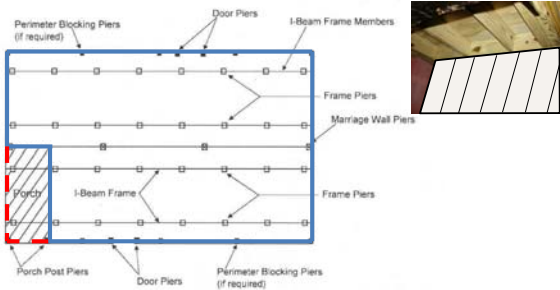
- Follow perimeter of the homes conditioned space.

Decks & Porches when part of home

Vented Panels installed to allow water to drain





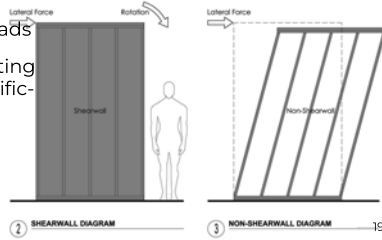


Shear Wall

• A shear wall is a structural system composed of braced panels to counter the effects of lateral loading on a structure

Wind and seismic effects are the most common loads

– Limitations on creating openings and other modifications



Shear Wall Identification

- Recognize shear wall locations by construction
- Look for transverse joist attachments to the frame (at each gable end and in the middle somewhere)
- They have a specific length and square footage requirement
- Not necessarily symmetrical side to side
- Any interior partition that is unique to other interior partitions are usually shear walls
- Get the factory construction drawings
- Manufacturer's assistance on opening limitations/modifications

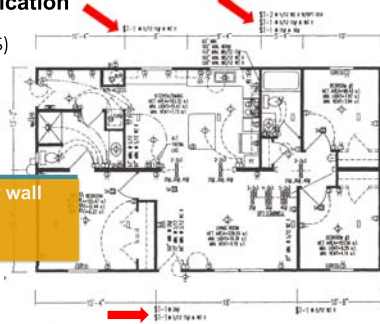
Shear Wall Identification

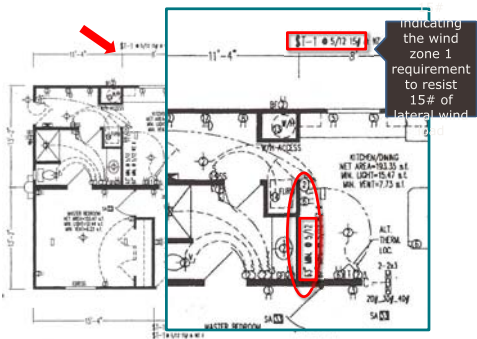
- Recognize shear wall locations by construction
- Look for transverse joist attachments to the frame (at each gable end and in the middle somewhere)
- They have a specific length and square footage requirement
- Not necessarily symmetrical side to side
- Any interior partition that is unique to other interior partitions are usually shear walls
- Get the factory construction drawings
- Manufacturer's assistance on opening limitations/modifications

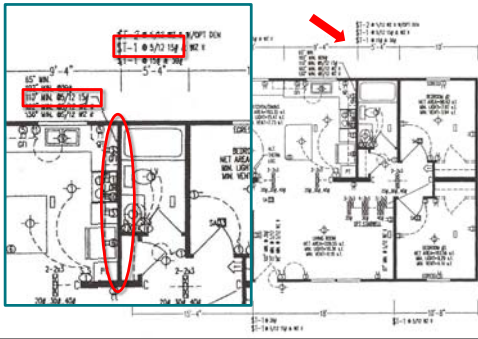
Shear Wall Identification

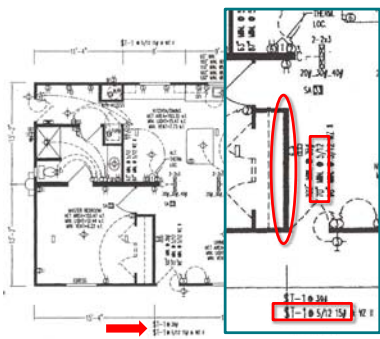
Identified by the (\$)

Where are the shear wall locations?
5/12 Roof pitch









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- Items such as roof rafter, floor joists, and window or door header sizing shall comply with 2020 RCNYS

Utilizing such chapters as:

Chapter 3: Building Planning

Chapter 5: Floors

Chapter 6: Wall Construction

Chapter 8: Roof-Ceiling Construction

And/or any other chapter necessary

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- Header sizing

Utilize Figure R301.2(6)

- To determine Ground Snow Load



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- Header sizing

Utilize Figure R301.2(6)

- To determine Ground Snow Load

Ground Snow Load:



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- Header sizing

Utilize Figure R301.2(6)

- To determine Ground Snow Load

Ground Snow Load:
50 psf



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- Header sizing

Tabular Data

- Table R602.7(1) Girder & Header Spans for Exterior Bearing Walls

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- Header sizing

Tabular Data

- Table R602.7(1) Girder & Header Spans for Exterior Bearing Walls

Other Tables include:

- Table R602.7(2) Girder & Header Spans for Interior Bearing Walls
- Table 602.7(3) Girder & Header Spans for Open Porches

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- Header sizing
 - Conversion of a Single door to double/sliding door 5' wide

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- Header sizing
 - Conversion of a Single door to double/sliding door 5' wide

Alteration Level 1 or Level 2?

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- Header sizing
 - Conversion of a Single door to double/sliding door 5' wide

Alteration Level 1 or Level 2?

Alteration - Level 2

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Remember our sample house
28' multi-sectional
50 psf ground snow load
double door

TABLE R602.7(1)
MINIMUM HEADER SPANS FOR EXTERIOR BEARING WALLS
(For single and double doors, Southern pine and spruce-pine-fir* and required number of jack studs)
GROUND SNOW LOAD (psf)*

Building width (feet)	50						70											
	12		16		24		12		16		24							
	Span*	NJP*	Span*	NJP*	Span*	NJP*	Span*	NJP*	Span*	NJP*	Span*	NJP*						
1-2-6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
1-2-8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-10	2	3-0	2	2-6	3
1-2-10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
1-2-12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
2-2-4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
2-2-6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	4-6	1	3-6	2	2-11	2
2-2-8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
2-2-10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
2-2-12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
3-2-8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
3-2-10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
3-2-12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-8	2
4-2-8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
4-2-10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	9-10	1	7-7	2	6-4	2
4-2-12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
5-2-6	5-3	1	3-7	1	2-5	1	3-6	1	2-4	1	2-0	1	2-5	1	1-10	1	1-4	1

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Remember our sample house
28' multi-sectional
50 psf ground snow load
double d

TABLE R602.7(1)
SPAN FOR EXTERIOR BEARING WALLS
Southern pine and spruce-pine-fir* and required number of jack studs

SUPPORTING		GROUND SNOW LOAD (psf)																
		Building width (feet)																
		30			36			42			48							
Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*					
1-2-6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
1-2-8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-0	2	3-0	2	2-6	3
1-2-10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
1-2-12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
2-2-4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
2-2-6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	6-6	1	3-6	2	2-11	2
2-2-8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
2-2-10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
2-2-12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
3-2-8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
3-2-10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
3-2-12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-6	2
4-2-8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
4-2-10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	10-1	1	7-7	2	6-4	2
4-2-12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
1-2-6	3-3	1	2-7	1	2-5	1	3-0	1	2-5	1	2-1	1	3-0	1	2-3	1	1-10	1

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Remember our sample house
28' multi-sectional
50 psf ground snow load
double d

TABLE R602.7(1)
SPAN FOR EXTERIOR BEARING WALLS
Southern pine and spruce-pine-fir* and required number of jack studs

SUPPORTING		GROUND SNOW LOAD (psf)																
		Building width (feet)																
		30			35			40			45							
Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*					
1-2-6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
1-2-8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-0	2	3-0	2	2-6	3
1-2-10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
1-2-12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
2-2-4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
2-2-6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	6-6	1	3-6	2	2-11	2
2-2-8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
2-2-10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
2-2-12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
3-2-8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
3-2-10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
3-2-12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-6	2
4-2-8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
4-2-10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	10-1	1	7-7	2	6-4	2
4-2-12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
1-2-6	3-3	1	2-7	1	2-5	1	3-0	1	2-5	1	2-1	1	3-0	1	2-3	1	1-10	1

NYS UERBC

Remember our sam
28' multi-sectional
50 psf ground snow
double d

TABLE R602.7(1)
SPAN FOR EXTERIOR BEARING WALLS
Southern pine and spruce-pine-fir* and required number of jack studs

SUPPORTING		GROUND SNOW LOAD (psf)																
		Building width (feet)																
		30			35			40			45							
Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*	Span	NJ*					
1-2-6	4-0	1	3-1	2	2-7	2	3-5	1	2-8	2	2-3	2	3-0	2	2-4	2	2-0	2
1-2-8	5-1	2	3-11	2	3-3	2	4-4	2	3-4	2	2-10	2	3-0	2	3-0	2	2-6	3
1-2-10	6-0	2	4-8	2	3-11	2	5-2	2	4-0	2	3-4	3	4-7	2	3-6	3	3-0	3
1-2-12	7-1	2	5-5	2	4-7	3	6-1	2	4-8	3	3-11	3	5-5	2	4-2	3	3-6	3
2-2-4	4-0	1	3-1	1	2-7	1	3-5	1	2-7	1	2-2	1	3-0	1	2-4	1	2-0	1
2-2-6	6-0	1	4-7	1	3-10	1	5-1	1	3-11	1	3-3	2	6-6	1	3-6	2	2-11	2
2-2-8	7-7	1	5-9	1	4-10	2	6-5	1	5-0	2	4-2	2	5-9	1	4-5	2	3-9	2
2-2-10	9-0	1	6-10	2	5-9	2	7-8	2	5-11	2	4-11	2	6-9	2	5-3	2	4-5	2
2-2-12	10-7	2	8-1	2	6-10	2	9-0	2	6-11	2	5-10	2	8-0	2	6-2	2	5-2	3
3-2-8	9-5	1	7-3	1	6-1	1	8-1	1	6-3	1	5-3	2	7-2	1	5-6	2	4-8	2
3-2-10	11-3	1	8-7	1	7-3	2	9-7	1	7-4	2	6-2	2	8-6	1	6-7	2	5-6	2
3-2-12	13-2	1	10-1	2	8-6	2	11-3	2	8-8	2	7-4	2	10-0	2	7-9	2	6-6	2
4-2-8	10-11	1	8-4	1	7-0	1	9-4	1	7-2	1	6-0	1	8-3	1	6-4	1	5-4	2
4-2-10	12-11	1	9-11	1	8-4	1	11-1	1	8-6	1	7-2	2	10-1	1	7-7	2	6-4	2
4-2-12	15-3	1	11-8	1	9-10	2	13-0	1	10-0	2	8-5	2	11-7	1	8-11	2	7-6	2
1-2-6	3-3	1	2-7	1	2-5	1	3-0	1	2-5	1	2-1	1	3-0	1	2-3	1	1-10	1

NYS UEPBC

Remember our same 28' multi-sectional 50 psf ground snow double dr

Interpolation	span	nj
1-2x6	2-5	2
1-2x8	3-1	2
1-2x10	3-8	3
1-2x12	4-3	3
2-2x4	2-4	1
2-2x6	3-7	2
2-2x8	4-7	2
2-2x10	5-5	2
2-2x12	6-4	2
3-2x8	5-9	2
3-2x10	6-9	2
3-2x12	8-0	2
4-2x8	6-7	1
4-2x10	7-10	2
4-2x12	9-2	2

GROUND SNOW LOAD (psf)

Building width (feet)		30				70					
12	24	36	12	24	36	12	24	36			
span	Nj	span	Nj	span	Nj	span	Nj	span	Nj		
1-5	1	2-5	2	2-5	2	1-0	2	2-4	2	2-0	2
1-4	2	3-4	2	2-10	2	1-0	2	3-0	2	2-6	3
1-2	2	4-0	2	3-4	3	1-7	2	3-6	3	3-0	3
1-1	2	4-8	3	3-11	3	1-5	2	4-2	3	3-6	3
1-5	1	2-7	1	2-2	1	1-0	1	2-4	1	2-0	1
1-1	1	3-11	1	3-5	2	1-0	1	3-6	2	2-11	2
1-5	1	5-0	2	4-2	2	1-0	1	4-5	2	3-0	2
1-8	2	5-11	2	4-11	2	1-0	2	5-3	2	4-5	2
1-0	2	6-11	2	5-10	2	1-0	2	6-2	2	5-2	3
1-1	1	6-3	1	5-3	2	1-2	1	5-6	2	4-8	2
1-7	1	7-4	2	6-2	2	1-6	1	6-7	2	5-6	2
1-3	2	8-8	2	7-4	2	1-0	2	7-9	2	6-6	2
1-4	1	7-2	1	6-0	1	1-3	1	6-4	1	5-4	2
1-1	1	8-6	1	7-2	2	1-0	1	7-7	2	6-4	2
1-0	1	10-0	2	8-5	2	1-7	1	8-11	2	7-6	2

Five horizontal lines for notes.

NYS UFPBC

- Header sizing
 - 2x6 w/ 1 Jack Studs
- Wait the Manufacturers...



Five horizontal lines for notes.

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R507 Exterior Decks Heavily Revised

- Deck Footing Sizes
- Porch/Deck Joist Span allowances

Tabular Data - Table R507.6 Deck Joist Spans for Common Lumber Species

Don't forget about the other tables for Floor Joist, Roof Rafters...

Five horizontal lines for notes.

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TABLE R507.6
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)

SPECIES ^a	SIZE	ALLOWABLE JOIST SPAN ^b			MAXIMUM CANTILEVER ^c		
		SPACING OF DECK JOISTS (ft/inches)			SPACING OF DECK JOISTS WITH CANTILEVER ^d (ft/inches)		
		12	16	24	12	16	24
Southern pine	2 x 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 x 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 x 10	16-2	14-0	11-5	3-4	3-6	2-10
Douglas fir-larch ^e , hem-fir ^e , spruce-pine-fir ^e	2 x 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 x 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 x 10	15-8	13-7	11-1	3-1	3-5	2-9
Redwood, western cedar, ponderosa pine ^f , red pine ^f	2 x 6	8-0	8-0	7-0	1-0	1-1	1-2
	2 x 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 x 10	14-11	13-0	10-7	2-8	2-10	2-8
2 x 12	17-5	15-1	12-4	3-10	3-9	3-1	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.
a. No. 2 grade with wet service factor.
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L & A = 360.
c. Ground snow load, live load = 40 psf, dead load = 10 psf, L & A = 360 at main span, L & A = 180 at cantilever with a 220-pound point load applied to end.
d. Includes incising factor.
e. Southern species with no incising factor.
f. Cantilevered span not exceeding the nominal depth of the joist are permitted.

Cursory in nature


Cannot cover every conceivable situation
The intend was a broad overview of general information
Additional research by participants may be necessary

Remember that links to online versions of the 2020
Residential Code of New York are here:

<https://codes.iccsafe.org/codes/new-york>

Exam...

Attendees sign the Class Registration List to receive credit

REGISTRATION CODE	CLASSIFICATION	PRINTED NAME	EMAIL ADDRESS	SIGNATURE	DATE
John Hancock	<input type="checkbox"/>	John Hancock	jhancock1989@yahoo.com		<input type="checkbox"/>

Course Attendance Issues

The Division of Building Standards and Codes will not give course attendees credit for a course without the required signatures.

For technical assistance

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Any questions?

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