

CHAPTER 23
WOOD

Adopt and/or codify chapter as amended below:

PROPOSED ADOPTION	DSA-SS	DSA-SS/CC	Comments
Adopt entire chapter without amendments			
Adopt entire chapter with amendments listed below	X	X	
Adopt only those sections listed below			
<i>2301.1.1</i>	X	X	
<i>2301.1.2</i>	X	X	
<i>2301.1.3</i>	X	X	
<i>2301.1.3.1</i>	X	-	
<i>2301.1.3.2</i>	-	X	
<u><i>2301.1.4</i></u>	<u>X</u>	<u>X</u>	
<i>2301.2, Item 4, Exception</i>	X	X	
<i>2303.1.3.1</i>	X	X	
<u><i>2303.1.4.1</i></u>	<u>X</u>	<u>X</u>	
<i>2303.4.1.4.1, Exception 3</i>	X	X	
<i>2303.4.3.1</i>	X	X	
<i>2304.3.4</i>	X	X	
<i>2304.4.1</i>	X	X	
<u><i>2304.5</i></u>	<u>X</u>	<u>X</u>	
<i>2304.6.1, Exception</i>	X	-	
<u><i>2304.10.1.1 2304.9.1.1</i></u>	X	-	
<u><i>2304.12.1.2 2304.11.2.2, Exception</i></u>	X	<u>X</u>	
<u><i>2304.12.1.4.1 2304.11.2.4.1</i></u>	X	-	
<i>2305.1.2</i>	X	X	
<i>2305.2, Exception</i>	X	-	
<i>2305.3, Exception</i>	X	X	
<i>2306.2, Exception</i>	X	X	
<i>2306.3, Exception</i>	X	X	

2308.2.7 2308.2, Item 8	X	X	
-------------------------	---	---	--

(All existing California amendments that are not revised below shall continue without change)

DRAFT INITIAL EXPRESS TERMS

SECTION 2301

GENERAL

2301.1 Scope. The provisions of this chapter shall govern the materials, design, construction and quality of wood members and their fasteners.

2301.1.1 Application. *[DSA-SS & DSA-SS/CC]* The scope of application of Chapter 23 is as follows:

1. Applications listed in Sections 1.9.2.1 and 1.9.2.2, regulated by the Division of the State Architect-Structural Safety (DSA-SS, and DSA-SS/CC). These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.
2. **(Reserved for OSHPD)**

2301.1.2 Identification of amendments. *[DSA-SS & DSA-SS/CC]* Amendments appear in this chapter preceded with the appropriate acronym, as follows:

1. Division of the State Architect - Structural Safety:

[DSA-SS] - For applications listed in Section 1.9.2.1.

[DSA-SS/CC] - For applications listed in Section 1.9.2.2

2. **(Reserved for OSHPD)**

2301.1.3 Reference to other chapters.

2301.1.3.1 [DSA-SS] Where reference within this chapter is made to sections in Chapters 16, 17, 18, 19, 21, and 22, and 34, the provisions in Chapters 16A, 17A, 18A, 19A, 21A, and 22A, and 34A respectively shall apply instead.

Exception: ~~For DSA-SS, the requirements of Chapter 34 shall apply instead of Chapter 34A~~

2301.1.3.2 [DSA-SS/CC] Where reference within this chapter is made to sections in Chapters 17 and 18, the provisions in Chapters 17A and 18A respectively shall apply instead.

2301.1.4 Prohibition. (Relocated from 2013 CBC, Section 2305.1.2) **[DSA-SS & DSA-SS/CC]** The following design methods, systems, and materials are not permitted by DSA:

1. ~~Straight-sheathed horizontal lumber diaphragms are not permitted.~~
2. ~~Gypsum-based sheathing shear walls and portland cement plaster shear walls, are not permitted.~~
3. ~~Shear wall foundation anchor bolt washers shall be provided in accordance with AF & PA SDPWS Section 4.3.6.4.3. The exception to AF & PA AWC SDPWS Section 4.3.6.4.3. shall not apply.~~
4. ~~Wood structural panel shear walls and diaphragms using staples as fasteners, are not permitted.~~
5. ~~Unblocked shear walls, are not permitted.~~
6. ~~Any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic force-resisting system, shall be not applied directly to framing members.~~
7. ~~Single and double diagonally sheathed lumber walls shall not be used to resist seismic forces.~~
8. (Relocated from 2013 CBC, 2301.2 item 4) Log structures in accordance with ICC 400, are not permitted by DSA.

9. Design in accordance with AWC WFCM.

10. Cross-laminated timber used as part of the seismic force resisting system.

2301.2 General design requirements. The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

...

4. AWC WFCM in accordance with Section 2309.
5. The design and construction of log structures shall be in accordance with the provisions of ICC 400.

(Relocated to 2301.1.4 item 8) Exception: ~~[DSA-SS & DSA-SS/CC]~~ Log structures are not permitted by DSA.

...

SECTION 2302 DEFINITIONS

2302.1 Definitions. The following terms are defined in Chapter 2:

...

NATURALLY DURABLE WOOD.

Decay resistant.

Termite resistant.

...

SECTION 2303
MINIMUM STANDARDS AND QUALITY

2303.1 General. Structural sawn lumber; end-jointed lumber; prefabricated wood I-joists; structural glued-laminated timber; wood structural panels, fiberboard sheathing (when used structurally); hardboard siding (when used structurally); particleboard; preservative-treated wood; structural log members; structural composite lumber; round timber poles and piles; fire-retardant-treated wood; hardwood plywood; wood trusses; joist hangers; nails; and staples shall conform to the applicable provisions of this section.

...

2303.1.3 Structural glued-laminated timber. Glued-laminated timbers shall be manufactured and identified as required in ANSI/AITC A190.1 and ASTM D 3737.

2303.1.3.1 Additional requirements. [DSA-SS & DSA-SS/CC] *The construction documents shall indicate the following:*

1. *Dry or wet service conditions.*
2. *Laminating combinations and stress requirements.*
3. *Species group.*
4. *Preservative material and retention, when preservative treatment is required.*
5. *Provisions for protection during shipping and field handling, such as sealing and wrapping in accordance with AITC 111.*

When mechanical reinforcement such as radial tension reinforcement is required, such reinforcement shall comply with AITC 404 and shall be detailed accordingly in the construction documents. Construction documents shall specify that the moisture content of laminations at the time of manufacture shall not exceed 12% for dry conditions of use.

The design of fasteners and connections shall comply with AITC 117, Section I, Item 6 (Connection Design), and NDS Appendix E.

~~Refer to Section 1705A.5.4 for special inspection requirements during fabrication of structural glued laminated timbers.~~

2303.1.4 Structural glued cross-laminated timber. Cross-laminated timbers shall be manufactured and identified as required in ANSI/APA PRG 320.

2303.1.4.1 Additional requirements. [DSA-SS & DSA-SS/CC] Requirements in Section 2303.1.3.1 shall apply to glued cross-laminated timber.

...

2303.4.1.4.1 Truss design drawings. Where required by the *registered design professional*, the *building official*, or the statutes of the jurisdiction in which the project is to be constructed, each individual truss design drawing shall bear the seal and signature of the truss designer.

Exceptions:

1. Where a cover sheet and truss index sheet are combined into a single sheet and attached to the set of truss design drawings, the single cover/truss index sheet is the only document required to be signed and sealed by the truss designer.
2. When a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings, the cover sheet and the truss index sheet are the only documents required to be signed and sealed by the truss designer.

3. *[DSA-SS, DSA-SS/CC] Exceptions 1 and 2 are not permitted by DSA.*

2303.4.2 Truss placement diagram. The truss manufacturer shall provide a truss placement diagram that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The truss placement diagram shall be provided as part of the truss submittal package, and with the shipment

of trusses delivered to the job site. Truss placement diagrams that serve only as a guide for installation and do not deviate from the *permit* submittal drawings shall not be required to bear the seal or signature of the truss designer.

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; as applicable, the cover/truss index sheet.

2303.4.3.1 Additional Requirements. [DSA-SS, DSA-SS/CC] *In addition to Sections 2303.4.1 and 2303.4.2, the following requirements apply:*

1. **Construction Documents.** *The construction documents prepared by the registered engineer or licensed architect for the project shall indicate all requirements for the truss design, including:*

1.1 *Deflection criteria.*

1.2 *Connection details to structural and non-structural elements (e.g. non-bearing partitions).*

2. **Requirements for Approval.** *The truss design drawings and engineering analysis shall be provided to the enforcement agency and approved prior to truss fabrication, in accordance with the California Administrative Code. Alterations to the approved truss design drawings or manufactured trusses are subject to the approval of the enforcement agency.*

3. ~~**Special inspection during truss manufacture.** *Refer to Section 1705A.5.5 for special inspection requirements during the manufacture of open web trusses.*~~

2303.4.4 Anchorage. The design for the transfer of loads and anchorage of each truss to the supporting structure is the responsibility of the *registered design professional*.

2303.4.5 Alterations to trusses. Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and

approval of a *registered design professional*. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, piping, additional roofing or insulation, etc.) shall not be permitted without verification that the truss is capable of supporting such additional loading.

2303.4.6 TPI 1 Specifications. In addition to Sections 2303.4.1 through 2303.4.5, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. Job-site inspections shall be in compliance with Section 110.4, as applicable.

2303.4.7 Truss quality assurance. Trusses not part of a manufacturing process in accordance with either Section 2303.4.6 or a standard listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency, shall be manufactured in compliance with Sections 1704.2 and 1704.6, as applicable.

...

SECTION 2304

GENERAL CONSTRUCTION REQUIREMENTS

2304.1 General. The provisions of this section apply to design methods specified in Section 2301.2.

2304.2 Size of structural members. Computations to determine the required sizes of members shall be based on the net dimensions (actual sizes) and not nominal sizes.

2304.3 Wall framing. The framing of exterior and interior walls shall be in accordance with the provisions specified in Section 2308 unless a specific design is furnished.

2304.3.1 Bottom plates. Studs shall have full bearing on a 2-inch-thick (actual 1¹/₂-inch, 38 mm) or larger plate or sill having a width at least equal to the width of the studs.

2304.3.2 Framing over openings. Headers, double joists, trusses or other approved assemblies that are of adequate size to transfer loads to the vertical members shall be provided over window and door openings in load-bearing walls and partitions.

2304.3.3 Shrinkage. Wood walls and bearing partitions shall not support more than two floors and a roof unless an analysis satisfactory to the building official shows that shrinkage of the wood framing will not have adverse effects on the structure or any plumbing, electrical or mechanical systems, or other equipment installed therein due to excessive shrinkage or differential movements caused by shrinkage. The analysis shall also show that the roof drainage system and the foregoing systems or equipment will not be adversely affected or, as an alternate, such systems shall be designed to accommodate the differential shrinkage or movements.

2304.3.4 Additional requirements. [DSA-SS, DSA-SS/CC] *The following additional requirements apply:*

- 1. Engineering analysis shall be furnished that demonstrates compliance of wall framing elements and connections with Section 2301.2, Item 1 or 2.*
- 2. Construction documents shall include detailing of sill plate anchorage to supporting masonry or concrete for all exterior and interior bearing, non-bearing and shear walls. Unless specifically designed in accordance with item 1 above, sills under exterior walls, bearing walls and shear walls shall be bolted to masonry or concrete with 5/8" diameter by 12 inch (16 mm by 305 mm) bolts spaced not more than four (4) feet (1219 mm) on center, with a minimum of two (2) bolts for each piece of sill plate. Anchor bolts shall have a 4 inch minimum and a 12 inch maximum clearance to the end of the sill plate, and 7 inch minimum embedment into concrete or masonry.*

Unless specifically designed in accordance with item 1 above, sill plates under non-bearing interior partitions on concrete floor slabs shall be anchored at not more than four (4) feet (1219 mm) on center to resist a minimum allowable stress shear of 100 pounds per linear foot (1.4 kN/m) acting either parallel or perpendicular to the wall.

3. *Construction documents shall include detailing and limitations for notches and bored holes in wall studs, plates and sills.*

2304.4 Floor and roof framing. The framing of wood-joisted floors and wood framed roofs shall be in accordance with the provisions specified in Section 2308 unless a specific design is furnished.

2304.4.1 Additional requirements. *[DSA-SS, DSA-SS/CC] The following additional requirements apply:*

1. *Engineering analysis shall be furnished that demonstrates compliance of floor, roof and ceiling framing elements and connections with Section 2301.2, Items 1 or 2.*
2. *Construction documents shall include detailing and limitations for notches and bored holes in floor and roof framing members.*

...

2304.6 Exterior wall sheathing. Wall sheathing on the outside of exterior walls, including gables, and the connection of the sheathing to framing shall be designed in accordance with the general provisions of this code and shall be capable of resisting wind pressures in accordance with Section 1609.

2304.6.1 Wood structural panel sheathing. Where wood structural panel sheathing is used as the exposed finish on the outside of exterior walls, it shall have an exterior exposure durability classification. Where wood structural panel sheathing is used elsewhere, but not as the exposed finish, it shall be of a type manufactured with exterior glue (Exposure 1 or Exterior). Wood structural panel sheathing, connections and framing spacing shall be in accordance with Table 2304.6.1 for the applicable wind speed and exposure category where used in enclosed buildings with a mean roof height not greater than 30 feet (9144 mm) and a topographic factor (K_z) of 1.0.

Exception: *[DSA-SS] Wind pressure shall be calculated in accordance with Section 1609A.*

...

2304.10 Connections and fasteners.

...

2304.10.1 Fastener requirements. Connections for wood members shall be designed in accordance with the appropriate methodology in Section 2301.2. The number and size of fasteners connecting wood members shall not be less than that set forth in Table 2304.10.1.

2304.10.1.1 ~~2304.9.1.1~~ Additional requirements. [DSA-SS] *Fasteners used for the attachment of exterior wall coverings shall be of hot-dipped zinc-coated galvanized steel, mechanically deposited zinc-coated steel, stainless steel, silicon bronze or copper. The coating weights for hot-dipped zinc-coated fasteners shall be in accordance with ASTM A 153. The coating weights for mechanically deposited zinc coated fasteners shall be in accordance with ASTM B 695, Class 55 minimum.*

...

2304.12.1.2 Wood supported by exterior foundation walls. Wood framing members, including wood sheathing, that rest on exterior foundation walls and are less than 8 inches (203 mm) from exposed earth shall be of naturally durable or preservative-treated wood.

Exception: [DSA-SS] *At exterior walls where the earth is paved with an asphalt or concrete slab at least 18 inches (457 mm) wide and draining away from the building, the bottom of sills are permitted to be 6 inches (152 mm) above the top of such slab. Other equivalent means of termite and decay protection may be accepted by the enforcement agency.*

...

2304.12.1.4 Sleepers and sills. Sleepers and sills on a concrete or masonry slab that is in direct contact with earth shall be of naturally durable or preservative-treated wood.

2304.12.1.4.1 2304.11.2.4.1 Additional Requirements. [DSA-SS] Stud walls or partitions at shower or toilet rooms with more than two fixtures, and stud walls adjacent to unroofed paved areas shall rest on a concrete curb extending at least 6 inches (152 mm) above finished floor or pavement level.

...

SECTION 2305

GENERAL DESIGN REQUIREMENTS FOR LATERAL-FORCE-RESISTING SYSTEMS

...

2305.1.1 Openings in shear panels. Openings in shear panels that materially affect their strength shall be detailed on the plans, and shall have their edges adequately reinforced to transfer all shearing stresses.

2305.1.2 Additional Requirements. [DSA-SS, DSA-SS/CC] See Section 2301.1.4 for modifications to AWC SDPWS. ~~The following limitations shall apply:~~

(Relocated to Section 2301.1.4)

- ~~1. Straight sheathed horizontal lumber diaphragms are not permitted.~~
- ~~2. Gypsum-based sheathing shear walls and portland cement plaster shear walls are not permitted.~~
- ~~3. Shear wall foundation anchor bolt washers shall be provided in accordance with AF & PA SDPWS Section 4.3.6.4.3. The exception to AF & PA SDPWS Section 4.3.6.4.3 shall not apply.~~
- ~~4. Wood structural panel shear walls and diaphragms using staples as fasteners are not permitted.~~
- ~~5. Unblocked shear walls are not permitted.~~
- ~~6. Any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic force-resisting system shall be applied directly to framing members.~~

~~7. Single and double diagonally sheathed lumber walls shall not be used to resist seismic forces.~~

2305.2 Diaphragm deflection.

...

~~**Exception:** [DSA-SS, DSA-SS/CC] Section 2305.2 is not permitted by DSA~~

...

2305.3 Shear wall deflection

...

~~**Exception:** [DSA-SS, DSA-SS/CC] Section 2305.3 is not permitted by DSA.~~

...

SECTION 2306 ALLOWABLE STRESS DESIGN

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using *allowable stress design* shall be in accordance with the following applicable standards:

...

2306.2 Wood-frame diaphragms. Wood-frame diaphragms shall be designed and constructed in accordance with AWC SDPWS. Where panels are fastened to framing members with staples, requirements and limitations of AWC SDPWS shall be met and the allowable shear values set forth in Table 2306.2(1) or 2306.2(2) shall be permitted. The allowable shear values in Tables 2306.2(1) and 2306.2(2) are permitted to be increased 40 percent for wind design.

~~**Exception:** [DSA-SS, DSA-SS/CC] Wood structural panel diaphragms using staples as fasteners are not permitted by DSA.~~

...

2306.3 Wood-frame shear walls. Wood-frame shear walls shall be designed and constructed in accordance with AWC SDPWS. Where panels are fastened to framing members with staples, requirements and limitations of AWC SDPWS shall be met and the allowable shear values set forth in Table 2306.3(1), 2306.3(2) or 2306.3(3) shall be permitted. The allowable shear values in Tables 2306.3(1) and 2306.3(2) are permitted to be increased 40 percent for wind design. Panels complying with ANSI/APA PRP-210 shall be permitted to use design values for Plywood Siding in the AWC SDPWS.

Exception: ~~[DSA-SS, DSA-SS/CC] Wood structural panel shear walls using staples as fasteners are not permitted by DSA.~~

...

SECTION 2308 CONVENTIONAL LIGHT-FRAME CONSTRUCTION

...

2308.2.7 ~~8.~~ **Additional requirements** *[DSA-SS & DSA-SS/CC] The use of conventional light-frame construction provisions in this section is permitted, subject to the following conditions:*

- 1. ~~8.1.~~ The design and construction shall also comply with Section 2304 and Section 2305.*
- 2. ~~8.2.~~ In conjunction with the use of provisions in Section 2308.6 ~~2308.3~~ (*Braced Wall-Lines bracing*), engineering analysis shall be furnished that demonstrates compliance of lateral-force-resisting systems with Section 2305.*
- 3. ~~8.3.~~ In addition to the use of provisions in Section 2308.4 ~~2308.8~~ (*Floor framing Joists*), engineering analysis shall be furnished that demonstrates compliance of floor framing elements and connections with Section 2301.2, Item 1 or 2.*

4. ~~8.4.~~ In addition to the use of provisions in Section 2308.5 ~~2308.9~~ (*Wall construction Framing*), engineering analysis shall be furnished that demonstrates compliance of wall framing elements and connections with Section 2301.2, Item 1 or 2.

5. ~~8.5.~~ In addition to the use of provisions in Section 2308.7 ~~2308.10~~ (*Roof and Ceiling Framing*), engineering analysis shall be furnished demonstrating compliance of roof and ceiling framing elements and connections with Section 2301.2, Item 1 or 2.

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

- Authority: Health and Safety Code Section 130005(g) & 130021
- Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)