International Code Council

ICC 400-2017 edition

Public Input Agenda based on input received On the 2012 edition of the ICC 400 standard

For February 21, 2017 Meeting - Teleconference

IS-LOG 01-17

ICC 400 Table 302.2(6)

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 02 Table 302.2(6)

Revise as follows:

TABLE 302.2(6)
APPLICABILITY OF ADJUSTMENT FACTORS FOR WALL LOGS AND SRTBs

$F_b' = F_b$ x	C_D	C_M	C_t	C_L	C_F	C_{fu}	C_i	C_r	—	—
$F_t' = F_t$ x	C_D	C_M	C_t	—	C_F	—	C_i	—	—	—
$F_v' = F_v$ x	C_D	C_M	C_t	—	—	—	C_i	—	—	—
$F_c' = F_c$ x	—	C_M	C_t	—	—	—	C_i	—	—	—
$F_c' = F_c$ x	C_D	C_M	C_t	—	C_F	—	C_i	—	C_P	—
$E' = E$x	—	C_M	C_t	—	—	—	C_i	—	—	C_T

a. *Load Duration Factor:* Values shown within Tables 302.2(3) and (5) are based upon normal load durations.

b. *Wet Service Factor:* Logs are to be installed and protected against moisture so as to achieve equilibrium moisture content in-service. Therefore, the Wet Service Factor shall not apply.

c. *Temperature Factor:* Per AF&PA NDS.

d. *Beam Stability Factor:* Per AF&PA NDS.

e. *Size Factor (wall logs ~~SRTB and USRTB~~):* Bending design values, F_b, shown within Table 302.2(5) are calculated for an inscribed member width of 12 inches (305mm). For gravity loads, the vertical dimension of the wall log is the width. For lateral loads, the horizontal dimension of the wall log is the width. The bending design value, F_b, shown with table 302.2(5) shall be multiplied by the size factor,

CF = (12/d) 1/9 <1.0,

Where: d = the width of the inscribed rectangle of the wall log relative to the direction of the imposed load being analyzed.

f. *Size Factor (wall logs):* Bending design values, F_b, shown within Table 302.2(3) are calculated for a 2"× 2" (51mm × 51mm). Currently ASTM D 3957 does not explicitly require a size reduction for SRTB values. However, this is commonly performed within the industry and the applicability of this factor is at the designer's discretion. Should a size reduction be necessary, the bending design value, F_b, show within Table 302.2(3) shall be multiplied by the size factor,

CF = (2.2568/d) 1/9

Where: d = log diameter

g. *Flat Use Factor:* Not applicable for any use of wall logs or sawn round timbers.

h. *Incising Factor:* Per AF&PA NDS.

i. *Repetitive Member Factor:* Not applicable for any use of wall logs or sawn round timbers.

j. *Buckling Stiffness Factor:* Not applicable for any use of wall logs or sawn round timbers.

k. *Column Stability Factor:* Per AF&PA NDS.

Reason: Errata carried over from 2007 edition.

IS-LOG 02-17

ICC 400 Sections 302.2.3.4.1 (New), 302.2.3.4.2 (New), 302.2.3.4.2.1 (New), 302.2.3.4.2.2 (New) and 302.2.3.1.3 (New)

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 06 302.2.3.4

Revise as follows:

302.2.3 Design values. Elements of log structures shall have design values as prescribed in this section.

302.2.3.4 Section Properties. <u>Sections properties shall be determined in accordance with this section.</u>

<u>**302.2.3.4.1 Sawn Round and Unsawn Round Timber Beams.**</u> Section properties for Sawn Round and Unsawn Round Timber Beams shall be in accordance with Table 302.2(2).

<u>**302.2.3.4.2 Wall Logs.** Section properties for Wall Logs shall be in accordance with the provisions of this section.</u>

<u>**302.2.3.4.2.1 Prescribed method.**</u> Section properties for wall logs shall be determined using the log height and width dimensions of the largest rectangle that can be inscribed with the profile. ~~in accordance with section 302.2.3.5 and 302.2.3.6.~~

Exception: When a square is inscribed within the profile of a round log, the section properties of the inscribed square may be increased by the factors shown in Table 302.2(4).

<u>**302.2.3.4.2.2 Engineering analysis.** Section properties for wall logs are permitted to be determined by engineering analysis.</u>

<u>**302.2.3.1.3 Natural taper.** Natural taper shall be permitted in posts and wall logs in excess of the grading rules developed per ASTM D-3957. Section properties for a structural log with natural flared butt shall be determined by the tip diameter/dimension.</u>

Reason: The requirement for using the inscribed rectangle is set by ASTM D3957 for the purposes of establishing maximum allowable knot size. The standard does not specify the method for establishing the section properties of wall logs. While the inscribed rectangle does provide a conservative evaluation of section properties, it should be the prescriptive minimum. An engineering analysis option should be permitted.

IS-LOG 03-17

ICC 400 Sections 305.4.1, Table 305.4.1(1) (New), 305.4.3.1, 305.4.3.2, 305.4.2.2

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 01 305.4.1

Revise as follows:

SECTION 305
THERMAL ENVELOPE

305.4 Thermal mass effect of log walls. The thermal mass benefit of log walls shall be determined in accordance with this section.

305.4.1 Prescribed method. Log walls shall be evaluated as mass walls in accordance with Section 402.2.4 of the *International Energy Conservation Code* and Table 305.4.1 (1).

Table 305.4.1(1)

Specific Gravity (SG)	**Minimum Log Thickness W_L (inches)**
0.29	9
0.32	8
0.34	7.5
0.37	7
0.39	6.5
0.42	6
0.46	5.5
0.53	5
0.65	4

For SI: 1 inch=25.4 mm

Notes:

1. Heat Capacity = Specific Heat of Wood x Density x Log Thickness
2. Density (lb/ft^3) @ 12% EMC

305.4.2 Test method. Physical testing of the thermal mass shall be in accordance with ASTM C 976.

305.4.3 Calculation method for computer modeling.

305.4.3.1 ~~Weight~~ Density of wall. Calculate the ~~weight~~ density of the wall ~~in pounds per square foot (psf)~~ using the density equation in Section 302.2.3.7 using the service (MC_S) in place of the design (MC_D) moisture content.

305.4.3.2 Heat capacity. Calculate the heat capacity for the thermal mass provision using the following.

$HC = w \times c$

where:

HC = Heat capacity of the exterior wall, Btu/ft^2 × °F [kJ/(m^2 × K)] of exterior wall area.

w = Mass of the exterior wall, lb/ft^2 (kg/m^2) of exterior wall area is the density of the exterior wall material, lb/ft^3 (kg/m^3) multiplied by ~~the thickness of the exterior wall calculated in accordance with section~~ log thickness (W_L) in accordance with Section 302.2.3.6.

c = Specific heat of the exterior wall material, Btu/lb × °F [kJ / (kg × K)] of exterior wall area as determined from Table 305.4.1.3. The moisture content references in Table 305.4.1.3 shall be selected to be less than or equal to MC_S.

~~**305.4.2.2 Determine the mass *Uw*.** Referring to IECC Table 502.2.1.1.2(3), select the column by matching the *Uw* determined in Section 305.4.2.1 to those heading the columns. Select the row according to the design heating degree days. Where the column and row cross provides the *Uw* with thermal mass effect.~~

Reason: This revision coordinates Section 305.4 with the 2015 IRC/IECC and existing sections of ICC400-2012.

- 305.4.1. This section worked with IECC-2006-2012. However, with the 2015, the qualification to 6 Btu/ft2-oF needs to be met. The proposed table provides a prescriptive measure.
- 305.4.3.1 needs to be updated to refer to the density of the log wall in service, as that is the equilibrium moisture content assumed for all thermal evaluation. It is the density that is then used in to develop “w” for use in the equation. “w” is modified for accuracy in reference.
- 305.4.2.2 needs to be deleted as it refers to the 2003 IECC and is not appropriate. It should have been removed in the last update.

IS-LOG 04-17
ICC 400 Section 305.4.2.2

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 03 406.1

Revise as follows:

~~**305.4.2.2 Determine the mass *Uw*.** Referring to IECC Table 502.2.1.1.2(3), select the column by matching the *Uw* determined in Section 305.4.2.1 to those heading the columns. Select the row according to the design heating degree days. Where the column and row cross provides the *Uw* with thermal mass effect.~~

Reason: 305.4.2.2 should be deleted as it refers to parts of the 2003 IECC that no longer exist in the 2006 IECC. It should have been removed in the last update.

IS-LOG 05-17
ICC 400 Sections 305.4.3.1, 305.4.3.2

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 04 305.4.3.1

Revise as follows:

305.4.3 Calculation method for computer modeling.

305.4.3.1 Weight of wall. Calculate the weight of the wall in pounds per square foot (psf) ~~using the density equation in Section 302.2.3.7~~ in accordance with Section 302.2.3.8 using the service moisture content (MC_S) in place of design (MC_D) moisture content.

305.4.3.2 Heat capacity. Calculate the heat capacity for the thermal mass provision using the following.

$HC = w \times c$

where:

HC = Heat capacity of the exterior wall, Btu/ft2 × °F [kJ/(m2 × K)] of exterior wall area.

w = Mass of the exterior wall, lb/ft2 (kg/m2) of exterior wall area is the density of the exterior wall material, lb/ft3 (kg/m3) multiplied by ~~the thickness of the exterior wall calculated in accordance with section~~ log thickness (WL) in accordance with Section 302.2.3.6.

c = Specific heat of the exterior wall material, Btu/lb × °F [kJ / (kg × K)] of exterior wall area as determined from Table 305.4.1.3. The moisture content references in Table 305.4.1.3 shall be selected to be less than or equal to MCS.

Reason: 305.4.3.1 needs to be updated to refer to the density of the log wall in service as that is the equilibrium moisture content assumed for all thermal evaluation. It is this density that is then used in to develop “w” for use in the equation. “w” is modified for accuracy in reference.

IS-LOG 06-17
ICC 400 Chapter 3

Proponent: Mark S. Hope, P.E., Stafford Inspection & Consulting

Hope 01 Chapter 3

Add new text as follows:
(Underline not shown for clarity)

Stafford Inspection and Consulting Services, LLC
Sawn Round Timber Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Bald Cypress	Unsawn	1850	1000	900	145	615	1.2
	No. 1SR	1500	825	875	145	615	1.2
	No. 2SR	1250	675	725	145	615	1.2
	No. 3SR	725	400	425	145	615	1
Cedar Northern White	Unsawn	1150	650	500	110	370	0.7
	No. 1SR	950	525	475	110	370	0.7
	No. 2SR	800	450	400	110	370	0.7
	No. 3SR	450	250	225	110	370	0.5
Cedar Western Red	Unsawn	1500	800	700	135	385	1
	No. 1SR	1200	650	675	135	385	1
	No. 2SR	1000	550	575	135	385	1
	No. 3SR	575	325	325	135	385	0.8
Cedar Eastern Red	Unsawn	1950	1050	900	185	1035	0.7
	No. 1SR	1600	875	875	185	1035	0.7
	No. 2SR	1300	725	725	185	1035	0.7
	No. 3SR	750	425	425	185	1035	0.5
Douglas Fir	Unsawn	2050	1150	925	160	630	1.5
	No. 1SR	1700	925	900	160	630	1.5
	No. 2SR	1400	775	750	160	630	1.5
	No. 3SR	800	450	425	160	630	1.2
Douglas Fir North	Unsawn	2100	1150	925	165	695	1.6
	No. 1SR	1700	925	875	165	695	1.6
	No. 2SR	1400	775	725	165	695	1.6
	No. 3SR	825	450	425	165	695	1.3
Douglas Fir South	Unsawn	2000	1100	825	165	520	1.2
	No. 1SR	1600	900	800	165	520	1.2
	No. 2SR	1350	750	675	165	520	1.2
	No. 3SR	775	425	375	165	520	0.9
Alpine Fir	Unsawn	1450	775	625	125	315	1.1
	No. 1SR	1150	650	600	125	315	1.1
	No. 2SR	975	525	500	125	315	1.1
	No. 3SR	550	300	275	125	315	0.9
Hemlock Eastern Tamarack	Unsawn	1600	975	775	155	550	1.1
	No. 1SR	1450	800	750	155	550	1.1
	No. 2SR	1200	675	625	155	550	1.1
	No. 3SR	700	375	350	155	550	0.9
Hemlock Western	Unsawn	1800	1000	850	165	410	1.3
	No. 1SR	1500	825	825	165	410	1.3
	No. 2SR	1250	675	675	165	410	1.3
	No. 3SR	700	400	400	165	410	1.1

Stafford Inspection and Consulting Services, LLC
Sawn Round Timber Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Douglas Fir - Larch	Unsawn	2250	1250	1000	170	605	1.5
	No. 1SR	1850	1000	975	170	605	1.5
	No. 2SR	1550	850	825	170	605	1.5
	No. 3SR	875	475	475	170	605	1.2
Hem - Fir	Unsawn	1600	875	725	150	440	1.2
	No. 1SR	1300	725	700	150	440	1.2
	No. 2SR	1100	600	600	150	440	1.2
	No. 3SR	625	350	325	150	440	0.9
Eastern White Pine	Unsawn	1350	750	625	125	350	1
	No. 1SR	1100	600	600	125	350	1
	No. 2SR	925	500	500	125	350	1
	No. 3SR	525	300	275	125	350	0.8
Eastern Woods & Softwoods	Unsawn	1350	750	625	125	350	1
	No. 1SR	1100	600	600	125	350	1
	No. 2SR	925	500	500	125	350	1
	No. 3SR	525	300	275	125	350	0.8
Lodgepole Pine	Unsawn	1500	825	650	125	400	1.1
	No. 1SR	1250	675	625	125	400	1.1
	No. 2SR	1050	575	525	125	400	1.1
	No. 3SR	600	325	300	125	400	0.9
Ponderosa Pine	Unsawn	1400	775	625	130	440	1
	No. 1SR	1150	625	600	130	440	1
	No. 2SR	975	525	500	130	440	1
	No. 3SR	550	300	275	130	440	0.8
Jack Pine	Unsawn	1650	925	750	135	460	1.1
	No. 1SR	1350	750	725	135	460	1.1
	No. 2SR	1150	625	600	135	460	1.1
	No. 3SR	650	350	350	135	460	0.9
Red Pine	Unsawn	1600	875	700	125	410	1.3
	No. 1SR	1300	725	675	125	410	1.3
	No. 2SR	1100	600	550	125	410	1.3
	No. 3SR	625	350	325	125	410	1
Southern Yellow Pine	Unsawn	2000	1100	900	160	515	1.4
	No. 1SR	1650	900	875	160	515	1.4
	No. 2SR	1350	750	725	160	515	1.4
	No. 3SR	775	425	425	160	515	1.1
Mixed Southern Pine	Unsawn	2000	1100	875	160	515	1.2
	No. 1SR	1650	900	825	160	515	1.2
	No. 2SR	1350	750	700	160	515	1.2
	No. 3SR	775	425	400	160	515	1

Stafford Inspection and Consulting Services, LLC
Sawn Round Timber Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Engelmann	Unsawn	1350	725	525	125	320	1
Spruce	No. 1SR	1100	600	500	125	320	1
ES-LP-AF	No. 2SR	900	500	425	125	320	1
	No. 3SR	525	275	250	125	320	0.8
	Unsawn	1400	775	625	120	390	1.2
Eastern	No. 1SR	1150	625	600	120	390	1.2
Spruce	No. 2SR	950	525	500	120	390	1.2
	No. 3SR	550	300	300	120	390	0.9
MSP /	Unsawn	1350	750	625	125	350	1
E-Softwoods	No. 1SR	1100	600	600	125	350	1
	No. 2SR	925	500	500	125	350	1
	No. 3SR	525	300	275	125	350	0.8
	Unsawn	1350	725	525	125	305	1
SPF	No. 1SR	1100	600	500	125	305	1
	No. 2SR	900	500	425	125	305	1
	No. 3SR	525	275	250	125	305	0.8
Western	Unsawn	1300	725	525	125	315	1
Woods &	No. 1SR	1100	600	500	125	315	1
White Woods	No. 2SR	900	500	425	125	315	1
	No. 3SR	525	275	250	125	315	0.8

IS-LOG 07-17
ICC 400 Chapter 3

Proponent: Mark S. Hope, P.E., Stafford Inspection & Consulting

Hope 02 Chapter 3

Add new text as follows:
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Stafford Inspection and Consulting Services, LLC
Structural Building Log Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Bald Cypress	SSBL	1300	875	1000	150	615	1.3
	No.1SBL	1150	775	900	150	615	1.3
	No.2SBL	1000	675	775	150	615	1.1
	WL 40	775	525	575	150	615	1
	WL 30	575	375	450	150	615	1
Cedar Northern White	SSBL	850	575	550	115	370	0.7
	No.1SBL	750	500	500	115	370	0.7
	No.2SBL	650	425	425	115	370	0.6
	WL 40	500	325	325	115	370	0.5
	WL 30	375	250	250	115	370	0.5
Cedar Western Red	SSBL	1050	700	775	140	385	1
	No.1SBL	925	625	700	140	385	1
	No.2SBL	825	550	600	140	385	0.9
	WL 40	625	400	450	140	385	0.8
	WL 30	450	300	350	140	385	0.8
Cedar Eastern Red	SSBL	1400	925	1000	185	1035	0.7
	No.1SBL	1250	825	875	185	1035	0.7
	No.2SBL	1050	725	775	185	1035	0.6
	WL 40	800	550	575	185	1035	0.6
	WL 30	600	400	425	185	1035	0.6
Douglas Fir	SSBL	1500	1000	1050	165	630	1.6
	No.1SBL	1300	875	900	165	630	1.6
	No.2SBL	1150	775	800	165	630	1.4
	WL 40	850	575	600	165	630	1.3
	WL 30	650	425	450	165	630	1.3
Douglas Fir North	SSBL	1500	1000	1000	170	695	1.7
	No.1SBL	1300	900	900	170	695	1.7
	No.2SBL	1150	775	775	170	695	1.5
	WL 40	875	575	600	170	695	1.4
	WL 30	650	425	450	170	695	1.4
Douglas Fir South	SSBL	1400	950	925	165	520	1.2
	No.1SBL	1250	850	825	165	520	1.2
	No.2SBL	1100	725	700	165	520	1.1
	WL 40	825	550	525	165	520	1
	WL 30	625	425	400	165	520	1
Alpine Fir	SSBL	1050	700	675	125	315	1.1
	No.1SBL	900	600	600	125	315	1.1
	No.2SBL	800	525	525	125	315	1
	WL 40	600	400	400	125	315	0.9
	WL 30	450	300	300	125	315	0.9
Hemlock Eastern Tamarack	SSBL	1250	850	875	155	550	1.1
	No.1SBL	1150	750	775	155	550	1.1
	No.2SBL	975	650	675	155	550	1
	WL 40	750	500	500	155	550	0.9
	WL 30	550	375	375	155	550	0.9

Stafford Inspection and Consulting Services, LLC
Structural Building Log Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Hemlock Western	No.1SBL	1150	775	825	165	410	1.4
	No.2SBL	1000	675	725	165	410	1.3
	WL 40	750	500	550	165	410	1.1
	WL 30	575	375	400	165	410	1.1
Douglas Fir - Larch	SSBL	1600	1100	1150	175	605	1.6
	No.1SBL	1450	950	1000	175	605	1.6
	No.2SBL	1250	825	875	175	605	1.4
	WL 40	925	625	650	175	605	1.2
	WL 30	700	475	500	175	605	1.2
Hem - Fir	SSBL	1150	775	800	150	440	1.2
	No.1SBL	1000	675	725	150	440	1.2
	No.2SBL	900	600	625	150	440	1.1
	WL 40	675	450	475	150	440	1
	WL 30	500	325	350	150	440	1
Eastern White Pine	SSBL	975	650	675	125	350	1.1
	No.1SBL	875	575	600	125	350	1.1
	No.2SBL	750	500	525	125	350	1
	WL 40	575	375	400	125	350	0.8
	WL 30	425	275	300	125	350	0.8
Eastern Woods & Softwoods	SSBL	975	650	675	125	350	1.1
	No.1SBL	875	575	600	125	350	1.1
	No.2SBL	750	500	525	125	350	1
	WL 40	575	375	400	125	350	0.8
	WL 30	425	275	300	125	350	0.8
Lodgepole Pine	SSBL	1100	725	725	125	400	1.1
	No.1SBL	975	650	650	125	400	1.1
	No.2SBL	825	550	575	125	400	1
	WL 40	625	425	425	125	400	0.9
	WL 30	475	325	325	125	400	0.9
Ponderosa Pine	SSBL	1000	675	700	130	440	1.1
	No.1SBL	900	600	600	130	440	1.1
	No.2SBL	775	525	525	130	440	1
	WL 40	600	400	400	130	440	0.8
	WL 30	450	300	300	130	440	0.8
Jack Pine	SSBL	1200	800	825	140	460	1.1
	No.1SBL	1050	700	725	140	460	1.1
	No.2SBL	925	625	625	140	460	1
	WL 40	700	475	475	140	460	0.9
	WL 30	525	350	350	140	460	0.9
Red Pine	SSBL	1150	775	775	125	410	1.4
	No.1SBL	1000	675	675	125	410	1.4
	No.2SBL	875	600	600	125	410	1.2
	WL 40	675	450	450	125	410	1.1
	WL 30	500	325	325	125	410	1.1
Southern Yellow Pine	SSBL	1450	975	1000	160	515	1.5
	No.1SBL	1250	850	875	160	515	1.5
	No.2SBL	1100	750	775	160	515	1.3
	WL 40	825	550	575	160	515	1.2
	WL 30	625	425	425	160	515	1.2

Stafford Inspection and Consulting Services, LLC
Structural Building Log Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Mixed Southern Pine	No.1SBL	1250	850	850	160	515	1.3
	No.2SBL	1100	750	750	160	515	1.2
	WL 40	825	550	550	160	515	1
	WL 30	625	425	425	160	515	1
Engelmann Spruce ES-LP-AF	SSBL	950	650	600	125	320	1.1
	No.1SBL	850	575	525	125	320	1.1
	No.2SBL	750	500	450	125	320	1
	WL 40	550	375	350	125	320	0.9
	WL 30	425	275	250	125	320	0.9
Eastern Spruce	SSBL	1000	675	700	125	390	1.2
	No.1SBL	900	600	625	125	390	1.2
	No.2SBL	775	525	525	125	390	1.1
	WL 40	575	400	400	125	390	1
	WL 30	450	300	300	125	390	1
MSP / E-Softwoods	SSBL	975	650	675	125	350	1.1
	No.1SBL	875	575	600	125	350	1.1
	No.2SBL	750	500	525	125	350	1
	WL 40	575	375	400	125	350	0.8
	WL 30	425	275	300	125	350	0.8
SPF	SSBL	950	650	600	125	305	1.1
	No.1SBL	850	575	525	125	305	1.1
	No.2SBL	750	500	450	125	305	1
	WL 40	550	375	350	125	305	0.9
	WL 30	425	275	250	125	305	0.9
Western Woods & White Woods	SSBL	950	650	600	125	315	1
	No.1SBL	850	575	525	125	315	1
	No.2SBL	725	500	450	125	315	0.9
	WL 40	550	375	350	125	315	0.8
	WL 30	425	275	250	125	315	0.8

Stafford Inspection and Consulting Services, LLC
Structural Building Log Design Values

Hardwood Design Values

Species	Grade	Fb	Ft	Fc//	Fv	FcT	MOE X 10^6
Red Oak	SSBL	1250	850	775	155	820	1.2
	No.1SBL	1100	750	675	155	820	1.2
	No.2SBL	975	650	600	155	820	1.1
	WL 40	725	500	450	155	820	1
	WL 30	550	375	325	155	820	1
White Oak	SSBL	1450	975	875	205	800	1.2
	No.1SBL	1300	875	775	205	800	1.2
	No.2SBL	1100	750	675	205	800	1
	WL 40	850	575	525	205	800	0.9
	WL 30	625	425	375	205	800	0.9
Mixed Oak	SSBL	1250	850	775	155	820	1.2
	No.1SBL	1100	750	675	155	820	1.2
	No.2SBL	975	650	600	155	820	1.1
	WL 40	725	500	450	155	820	1
	WL 30	550	375	325	155	820	1
Yellow Poplar	SSBL	1100	725	675	130	420	1.3
	No.1SBL	950	650	600	130	420	1.3
	No.2SBL	825	550	525	130	420	1.2
	WL 40	625	425	400	130	420	1
	WL 30	475	325	300	130	420	1

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ICC 400 Sections 406.1, 406.1.1 (New), 406.1.1.1 (New), 406.1.1.2 (New), Table 406.1.1.2.4 (New)

Proponent: Rob Pickett, Rob Pickett & Associates, LLC

Pickett 05 406.1

Revise as follows:

SECTION 406
LOG WALLS

406.1 Load resistance. Log walls shall be designed to resist wind and seismic loads, gravity loads, and uplift loads in accordance with applicable load standards. ~~The maximum shear wall aspect ratio shall be 1:1 for walls used in the design of shear walls to resist wind and seismic loads.~~

Add new text as follows:

406.1.1 Log shear walls. Log shear walls shall comply with this section.

406.1.1.1 Prescriptive requirement. The maximum shear wall aspect ratio shall be 1:1 for walls used in the design of shear walls to resist wind and seismic loads. Maximum fastener spacing shall be 48” on center.

406.1.1.2 Engineering analysis. Engineering analysis for log shear walls shall comply with this section.

406.1.1.2.1 Dowel-type fasteners. Dowel-type threaded fasteners shall be designed and installed with the full shank diameter at the shear plane.

406.1.1.2.1.1 Design values. Design capacities shall be calculated using the National Design Specification for Wood Construction (NDS) or as provided by evaluation reports on proprietary fasteners published by accredited sources.

406.1.1.2.1.2 Installation. Fasteners shall be installed to meet NDS provisions for installation or as provided by evaluation reports on proprietary fasteners. Fastener installation shall follow edge, end and spacing criteria in the NDS or proprietary reports to minimize splitting.

406.1.1.2.1.3 Schedule. For shear walls with aspect ratio of 1:1 or less, divide the design load for the log shear wall by the lateral resistance value of the fastener to find the number of fasteners to be evenly spaced over the length of the wall.

406.1.1.2.1.4 Response Modification Coefficient (R). The R value used varies with log bearing width and fastening schedule as per Table 406.1.1.2.1.4.

TABLE 406.1.1.2.1.4

Bearing width of the log provide (B_{LP})	$B_{LP} \leq$ 3inches	3 inches < $B_{LP} \leq$ 5 inches	5 inches< B_{LP}
Thru-bolt at corners, openings, and 6 feet 8 inches on center as	2.2	2.5	2.8

applicable. Without pinned connections			
Pinned at 12-24 inches on center[a]	4.5	5.0	5.5
Pinned at 30-48 inches on center[a]	4.0	4.5	5.0

For SI: 1 inch=25.4 mm
Notes to Table 406.1.1.2.1.4
a. With or without thru-bolts used to resist tension loads.

Reason: Testing and analyses were conducted to provide a basis for making recommendations to building designers regarding methods for estimating seismic design coefficients used to determine earthquake loads on buildings, which are lacking in current building codes.

Supporting research is provided by the following:
1. Graham, Drew Abram, "PERFORMANCE OF LOG SHEAR WALLS AND LAG SCREW CONNECTIONS SUBJECTED TO MONOTONIC AND REVERSE-CYCLIC LOADING,"
A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE IN CIVIL ENGINEERING, WASHINGTON STATE UNIVERSITY, Department of Civil and Environmental Engineering, MAY 2007
2. Beaudette Consulting Engineers Inc., "SEISMIC DESIGN – LOG WALLS JUSTIFICATION - RESPONSE MODIFICATION COEFFICIENT (R)"

Staff Note: To view supporting research go to the end of this document.

IS-LOG 09-17
ICC 400 General

Proponent: Mark Mize, Chad Stewart & Associates, Inc.

Mize 01 302.2.3.4

General Comment: (paraphrased from original comment)

A single-story log home has multiple bearing and non-bearing walls that are out of plumb up to 3" (all walls are log). The NAHB Residential Construction Performance Guildelines have a performance guideline in section 4-1-1 that limits wood-framed walls to 3/8" out-of-plumb for every 32" of height. However, since log homes are stacked members, this guideline likely would not be suitable for a log home application. This committee should consider having a provision guiding the alignment and plumbness of stacked log walls included in the next ICC 400.

A capacity analysis of the walls in their out-of-plumb state may be performed in order to determine their ability to resist the code-required design loads. The proponent has expressed interest in sharing these results with the committee.