Testcont120 Live Support at 920-381-6714 or tmklinka@hotmail.com

Instructions: **Fees: $35**

1. Circle the correct answers.
2. Transfer the answers to the answer sheet.
3. Mail in only the answer sheet with your payment as noted on the answer sheet.

This 4 hour course is approved for:
1. Dwelling Contractor Qualifier Continuing Education.
2. Initial Dwelling Contractor Qualifier Certification 12 hours total required (this is part 3 of 3).
3. UDC Construction Inspector.
4. Commercial Building Inspector.
5. Manufactured Home Installer.

Notes
1. PLF-pounds per lineal foot
2. PSF-pounds per square foot
3. Always assume total load (both live load + dead load = total load) unless noted.

OSB Structural 1 Rated Sheathing Roof Panels APA Span Ratings

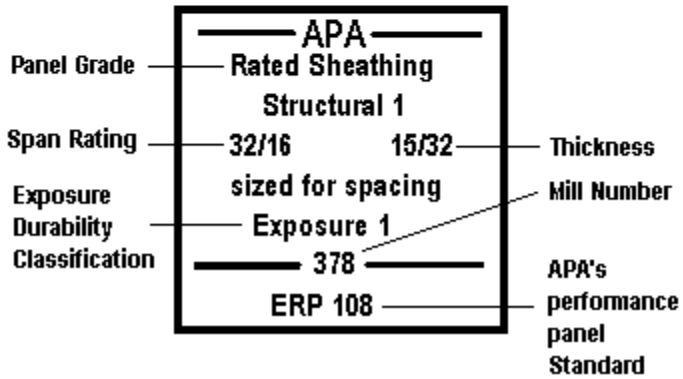
Thickness	APA Span Rating	Max Live Load for Roofs (lbs)**
3/8"	24/0	30
7/16"	24/16	40
15/32"	32/16	70
1/2"	32/16	70

** Live load for 24" oc span conditions
10 psf dead load assumed

* Wall panels 7/16" thick may be used in studs spaced up to 24" oc.

* Sturctural 1 OSB panels have superior maximum live load over standard OSB when installed with the long axis parallel to the sturctural supports.

* OSB sheathing panels sold by LP in Canada meet or exceed the requirements established by the Canadian Standard Association CSA 0325 and or CSA 0427.



Use above information for questions 1-4 below

1. The maximum wall stud spacing for 7/16" OSB is _____ .
   a. 16"
   b. 19.3"
   c. 24"
   d. 32"

2. 3/8" OSB may span _____ when used as a roof panel.
   a. 16"
   b. 19.3"
   c. 24"
   d. 32"

3. What is the maximum live load for roofs in pounds for ½" OSB
   a. 30
   b. 40
   c. 50
   d. 70

4. The numbers above (next to span rating) 32/16 stand for 32" on center for roof panels and 16" on center for floor panels. What size panel above has the 32/16 rating?
   a. 7/16"
   b. 15/32"
   c. ½"
   d. Both b & c

RECOMMENDED ROOF LOADS (PSF) FOR APA RATED SHEATHING WITH STRENGTH AXIS PARALLEL TO SUPPORTS [e][f]

Panel Grade	Thickness (in.)	Span Rating	Maximum Span (in.)	Load at Maximum Span Live	Load at Maximum Span Total
Structural 1 Rated Sheathing	7/16	24/0, 24/16	24[d]	20	30
	15/32	32/16	24	35[e]	45[e]
	1/2	32/16	24	40[e]	50[e]
	19/32, 5/8	40/20	24	70	80
	23/32, 3/4	48/24	24	90	100
Rated Sheathing	7/16[b]	24/0, 24/16	16	40	50
	15/32[b]	32/16	24[d]	20	25
	1/2[b]	24/0, 32/16	24[d]	25	30
	19/32	40/20	24	40[e]	50[e]
	5/8	32/16,40/20	24	45[e]	55[e]
	23/32, 3/4	40/20, 48/24	24	60[e]	65[e]

(d) Solid blocking recommended at panel ends for 24-inch span.
(e) For guaranteed or warranted roofs, contact membrane manufacturer for acceptable deck.
(f) Provide edge support.

Use above information for questions 5-6 below

5. What is the maximum total load for 23/32" "Structural 1 Rated Sheathing" at the maximum span?

a. 70
b. 80
c. 90
d. 100

6. What is the maximum live load for 7/16" "Rated Sheathing" at the maximum span?
   a. 20
   b. 35
   c. 40
   d. 50

ALLOWABLE SHEAR (POUNDS PER FOOT) FOR LP PANEL SHEAR WALLS WITH FRAMING OF DOUGLAS-FIR, LARCH, OR SOUTHERN PINE[a] FOR WIND OR SEISMIC LOADING [b,h,i,j] (See also IBC Table 2306.4.1)

Panel Grade	Minimum Nominal Panel Thickness (in.)	Minimum Nail Penetration in Framing (in.)	Panels Applied Direct to Framing: Nail Size (Common or Galvanized Box)	Panels Applied Direct to Framing: Nail Spacing at Panel Edge (in.) 6	4	3	2[e]	Panels Applied Over 1/2" or 5/8" Gypsum Sheathing: Nail Size) (common or Galvanized Box)	Nail Spacing at Panel Edges (in.) 6	4	3	2[e]
	5/16	1-1/4	6d	200	300	390	510	8d	200	300	390	510
	3/8			230[d]	360[d]	460[d]	610[d]					
Structural I	7/16	1-3/8	8d	255[d]	395[d]	505[d]	670[d]	10d	280	430	550[f]	730
Grades	15/32			280	430	550	730					
	15/32	1-1/2	10d	340	510	665[f]	870		—	—	—	—

Use above information for questions 7-10 below

7. How much allowable shear (pounds per foot) for a 7/16" Structural 1 panel (4' x 8') applied directly to framing and edge nailed at every 3" using an 8d nail be?
   a. 390
   b. 460
   c. 505
   d. 550

8. If a 4' x 8' sheet of structural 1 panel is applied correctly, how much allowable shear would the panel in question 7 above account for? Assume plf times answer from question 7 or 4' x ___ =.
   a. 2020
   b. 1580
   c. 2200
   d. None of the above

9. How much nail penetration in framing is required for question 7 above?
   a. 1 ¼"
   b. 1 3/8"
   c. 1 ½"
   d. All of the above

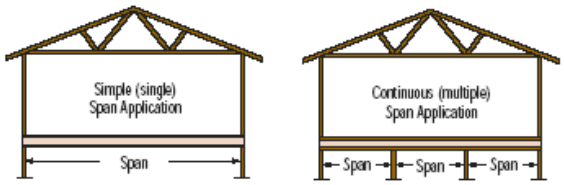
10. What is the minimum size nail to be used if question 7 above is applied over 5/8" gypsum sheathing?
    a. 6d

b. 8d
c. 10d
d. 12d

TO USE:

1. Select the appropriate table based on the project design loads.
2. For simple spans, select the L/480 or L/360 section of the tables, as required. For continuous spans, select the section with or without web stiffeners, as needed.
3. Find a span that meets or exceeds the design span.
4. Read the corresponding joist depth and spacing.

Caution: For floor systems that require both simple span and continuous span joists, it is a good idea to check both before selecting a joist. Some conditions are controlled by continuous span strength rather than simple span deflection.



SIMPLE SPAN TABLES

Series	Depth	40 psf Live Load, 10 psf Dead Load							
		L/480				L/360			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	16'-6"	15'-2"	14'-4"	13'-4"	18'-3"	16'-8"	15'-3"	13'-7"
	11-7/8"	19'-9"	18'-1"	17'-1"	15'-7"	21'-10"	19'-1"	17'-5"	15'-7"

Series	Depth	40 psf Live Load, 15 psf Dead Load							
		L/480				L/360			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	16'-6"	15'-2"	14'-4"	12'-11"	18'-3"	15'-11"	14'-6"	12'-11"
	11-7/8"	19'-4"	18'-1"	16'-7"	14'-10"	21'-1"	18'-3"	16'-7"	14'-10"

Series	Depth	40 psf Live Load, 25 psf Dead Load							
		L/480				L/360			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	16'-6"	14'-7"	13'-4"	11'-11"	16'-11"	14'-7"	13'-4"	11'-11"
	11-7/8"	19'-4"	16'-9"	15'-3"	13'-8"	19'-4"	16'-9"	15'-3"	13'-8"

CONTINUOUS SPAN TABLES

Series	Depth	40 psf Live Load, 10 psf Dead Load @ L/480							
		Without Web Stiffeners				With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	18'-0"	16'-5"	15'-2"	13'-6"	-	-	-	-
	11-7/8"	21'-6"	19'-0"	17'-4"	15'-6"	-	-	-	-

Series	Depth	40 psf Live Load, 15 psf Dead Load @ L/480							
		Without Web Stiffeners				With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	18'-0"	15'-10"	14'-5"	12'-10"	-	-	-	-
	11-7/8"	21'-0"	18'-2"	16'-6"	14'-9"	-	-	-	-

Series	Depth	40 psf Live Load, 25 psf Dead Load @ L/480							
		Without Web Stiffeners				With Web Stiffeners			
		12" oc	16" oc	19.2" oc	24" oc	12" oc	16" oc	19.2" oc	24" oc
18	9-1/2"	16'-10"	14'-6"	13'-3"	10'-11"	-	-	-	11'-0"
	11-7/8"	19'-3"	16'-8"	15'-2"	12'-10"	-	-	-	13'-7"

DESIGN ASSUMPTIONS:

1. The spans listed are the clear distance between supports.
2. The spans are based on uniform loads only.
3. These tables reflect the additional stiffness provided by 23/32" OSB APA-Rated Sheathing (48/24) or APA-Rated Sturd-I-Floor (24 oc), or equivalent, *glued and nailed* to the top flange of the joists.
4. Live load deflection has been limited to L/480 or L/360 as indicated in the tables above (L/480 only for continuous spans).
5. Total deflection has been limited to L/240.
6. The spans are based on the minimum required bearings as listed on page 4.

ADDITIONAL NOTES:

1. Web stiffeners are not required for any of the spans in the Simple Span tables. Web stiffeners are only required for the Continuous Span tables in the "With Web Stiffeners" section. A "-" indicates that there is no increase in span through the use of web stiffeners. Web fillers are required for joists seated in hangers that do not laterally support the top flange.
2. L/360 is the minimum deflection criteria allowed per code, which allows the maximum amount of deflection in the floor.
3. The design of continuous spans is based on the longest span. The shortest span must not be less than 50% of the longest span.
4. These spans are *not* evaluated for vibration.
5. Bridging, blocking, a direct-applied ceiling and/or bottom-flange bracing, though not required for vertical load capacity, can improve floor vibration and bounce.
6. For conditions not shown, contact your LP Engineered Wood Products distributor for assistance.

<u>Use above information for questions 11-14</u>

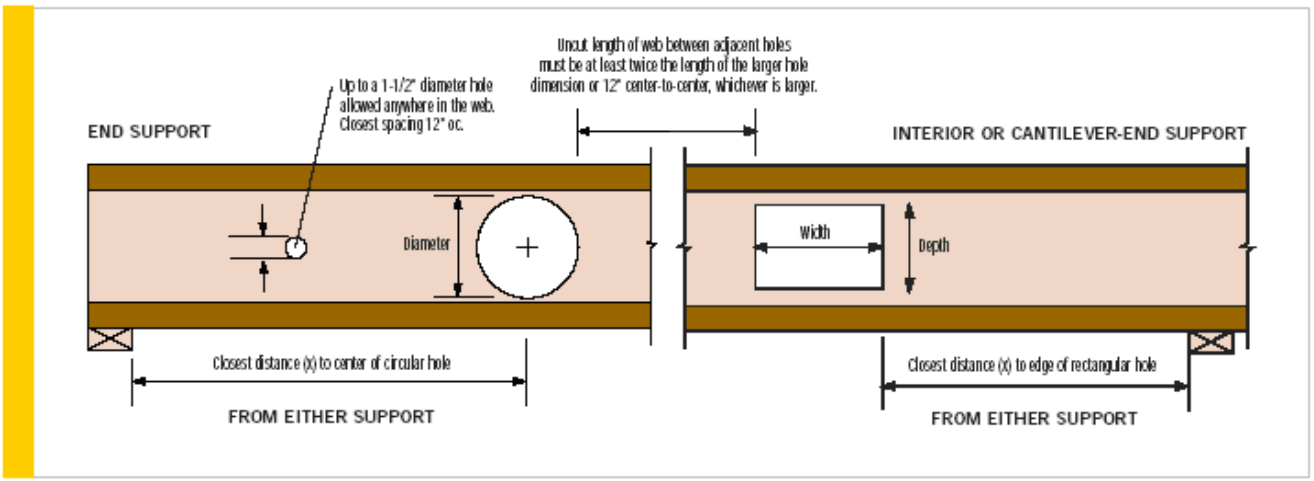
11. A continuous span 9-½" series 18 I joist without web stiffeners, a 40 psf live load, a 15 psf dead load, and 19.2 oc is allowed to span a maximum distance of?
    a. 18'
    b. 15' 10"

c. 14’ 5”
d. 12’ 10”

12. A continuous span 11-7/8” series 18 I joist without web stiffeners, a 40 psf live load, a 15 psf dead load, and 19.2 oc is allowed to span a maximum distance of?
    a. 21’
    b. 18’ 2”
    c. 16’ 6”
    d. 14’ 9”

13. A simple span 9½” series 18 I joist with a 40 psf live load, a 15 psf dead load, L/360, and 19.2 oc is allowed to span a maximum distance of?
    a. 18’ 3”
    b. 15’ 11”
    c. 14’ 6”
    d. 12’ 11”

14. A simple span 11-7/8” series 18 I joist with a 40 psf live load, a 10 psf dead load, L/480 and 19.2 oc is allowed to span a maximum distance of?
    a. 18’ 1”
    b. 195’ 9”
    c. 17’ 1”
    d. 15’ 7”



ROUND HOLES – UP TO 40 PSF LIVE LOAD AND 25 PSF DEAD LOAD; UP TO 24" OC

Series	Depth	Clear Span (ft)	Distance from End Support – Hole Diameter							Distance from Interior or Cantilever-End Support – Hole Diameter						
			2"	4"	6"	8"	10"	12"	14"	2"	4"	6"	8"	10"	12"	14"
18	9-1/2"	6	1'-0"	1'-0"	1'-6"	-	-	-	-	1'-0"	1'-0"	1'-6"	-	-	-	-
		8	1'-0"	1'-0"	1'-6"	-	-	-	-	1'-0"	1'-0"	1'-6"	-	-	-	-
		10	1'-0"	1'-0"	1'-6"	-	-	-	-	1'-0"	1'-0"	1'-6"	-	-	-	-
		12	1'-0"	1'-0"	1'-6"	-	-	-	-	1'-0"	1'-0"	2'-8"	-	-	-	-
		14	1'-0"	1'-0"	2'-2"	-	-	-	-	1'-0"	2'-5"	4'-2"	-	-	-	-
		16	1'-0"	1'-8"	3'-3"	-	-	-	-	1'-11"	3'-7"	5'-7"	-	-	-	-
		18	1'-0"	2'-9"	4'-7"	-	-	-	-	3'-6"	5'-4"	7'-2"	-	-	-	-
	11-7/8"	6	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-
		8	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-
		10	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-
		12	1'-0"	1'-0"	1'-6"	2'-0"	-	-	-	1'-0"	1'-0"	1'-9"	2'-11"	-	-	-
		14	1'-0"	1'-0"	1'-6"	2'-6"	-	-	-	1'-0"	1'-8"	3'-1"	4'-6"	-	-	-
		16	1'-0"	1'-0"	2'-1"	3'-8"	-	-	-	1'-6"	3'-2"	4'-4"	6'-0"	-	-	-
		18	1'-0"	1'-10"	3'-3"	5'-0"	-	-	-	3'-1"	4'-5"	5'-10"	7'-8"	-	-	-
		20	1'-7"	3'-1"	4'-7"	6'-1"	-	-	-	4'-5"	6'-0"	7'-6"	9'-0"	-	-	-
		22	2'-10"	4'-6"	5'-7"	7'-9"	-	-	-	6'-0"	7'-8"	8'-9"	11'-0"	-	-	-

Use above information for questions 15-18 below

15. What is the minimum distance from the end support allowed for a 9-1/2" I joist with a clear span of 18' and the round hole is 6"?
    a. 7'2"
    b. 4'7"
    c. 3'3"
    d. 5'10"

16. What is the minimum distance from the end support allowed for an 11-7/8" I joist with a clear span of 18' and the round hole is 6"?
    a. 7'2"
    b. 4'7"
    c. 3'3"
    d. 5'10"

17. Up to _____ diameter hole is allowed anywhere in the web.
    a. 1"
    b. 1 ½"
    c. 2"
    d. None of the above

18. The round hole in question 17 above must be ____ on center minimum from another hole.
    a. 24"
    b. 6"
    c. 12"
    d. 9"

MINIMUM FASTENER SCHEDULE TABLE

Other interior and exterior panel products and finishes installed per manufacturer requirements. For engineered connectors, use manufacturer's specified fasteners.

Description of Building Materials/Connection	Number and Type of Fastener[1 2 3]
Floor Framing	
Joist to joist, face nailed over support	2-12d
Joist to sill or girder, toe nail	2-16d, 3-8d
Band or rim joist to joist, end nail	*3-16d*
Band or rim joist to sill or top plate	*2-16d at 16" o.c.*
Bridging to joist, toe nail each end	2-8d
Built-up girder and beams, top loaded	10d at 32" o.c. at top and bottom and staggered and two at ends and at each splice
Built-up girder and beams, side-loaded	16d at 16" o.c. at top and bottom and staggered and two at ends and at each splice
Ledger strip to beam, face nail	3-16d each joist
Joist on ledger to beam, toe nail	3-8d
Wall Framing	
Sole plate to joist or blocking, face nail	16d at 16" o.c.
Top or sole plate to stud, end nail	2-16d
Stud to sole plate, toe nail	4-8d or 3-16d
Doubled studs, face nail	16d at 24" o.c.
Doubled top plates, face nail	16d at 16" o.c.
Top plates, laps and intersections, face nail	2-16d
Continuous header, two pieces	16d at 16" o.c. along each edge
Continuous header to stud, toe nail	4-8d
1" corner brace to each stud and plate, face nail	2-8d or 2 staples, 1 3/4"
Built-up corner studs	16d at 30" o.c., 16d at 24" o.c.
Roof/Ceiling Framing	
Ceiling joists to plate, toe nail	2-16d, 3-8d
Ceiling joist, laps over partitions, face nail	3-16d
Ceiling joist to parallel rafters, face nail	3-16d
Rafter to plate, toe nail (maximum 6' rafter span, engineered connector for longer)	2-16d, 3-8d
Roof rafters to ridge, valley or hip rafters, toe nail	4-16d
Roof rafters to ridge, valley or hip rafters, face nail	3-16d
Collar ties to rafters, face nail	3-8d
Boards and planks	
1" x 6" subfloor or less to each joist, face nail	2-8d or 2 staples, 1 3/4"
Wider than 1" x 6" subfloor toe to each joist, face nail	3-8d or 4 staples 1 3/4"
2" subfloor to joist or girder, blind and face nail	2-16d
1" x 6" roof sheathing to each bearing, face nail	2-8d or 2 staples, 1 3/4"
1" x 8" roof sheathing to each bearing, face nail	2-8d or 3 staples, 1 3/4"
Wider than 1" x 8" roof sheathing to each bearing, face nail	3-8d or 4 staples, 1 3/4"
2-inch planks	2-16d at each bearing

Use above information for questions 19-25 below

19. When nailing the bridging to the joist, what minimum size nail and how many nails are required at each end?
    a. 1-8d
    b. 2-8d
    c. 2-1 ¾" staple
    d. All of the above

20. What is the minimum fastening requirement for nailing two studs together?
    a. 2-10d 16"oc
    b. 2-10d 24" oc
    c. 16d 24" oc
    d. 2-16d 16" oc

21. What is the minimum fastening requirement for face nailing collar ties to rafters?
    a. 3-8d
    b. 3-10d
    c. 3-12d
    d. All of the above

22. What is the allowed fastening requirement for nailing 1" x 6" sub floor to each joist?
    a. 2-8d
    b. 2-10d
    c. 2-1 ¾" staples
    d. All of the above

23. What is the minimum fastening requirement for nailing a 2 ply continuous header?
    a. 16d at 24" oc and along each edge
    b. 12d at 24" oc and along each edge
    c. 16d two rows 24" oc
    d. None of the above

24. What is the minimum fastening requirement for nailing an 8' rafter span to the top plate?
    a. 2-16d
    b. 3-8d
    c. Engineered connector
    d. All of the above

25. What is the minimum size fastener required for nailing 1" x 4" corner bracing to the studs and plates?
    a. 2-8d
    b. 2-1 ¾" staples
    c. Neither a or b
    d. Both a & b

Panel Sheathing			
Material	Fastener	Spacing of Fastener	
		Edges	Intermediate Supports
Engineered wood panel for subfloor and roof sheathing and wall corner wind bracing to framing			
5/16-inch to 1/2-inch	6d common or deformed nail or staple, 1 1/2"	6"	12" [4]
5/8-inch to 3/4-inch	8d smooth or common, 6d deformed nail, or staple, 14 ga. 1 ¾"	6"	12" [4]
7/8-inch to 1-inch	8d common or deformed nail	6"	12"
1 1/8-inch to 1 1/4-inch	10d smooth or common, or 8d deformed nail	6"	12"
Combination subfloor/ underlayment to framing			
3/4-inch or less	6d deformed or 8d smooth or common nail	6"	12"
7/8-inch to 1-inch	8d smooth, common or deformed nail	6"	12"
1 1/8-inch to 1 1/4-inch	10d smooth or common or 8d deformed nail	6"	12"
Wood panel siding to framing			
1/2-inch or less	6d corrosion-resistant siding and casing nails	6"	12"
5/8-inch	8d corrosion-resistant siding and casing nails	6"	12"

[1]All nails are smooth-common, box or deformed shank except where otherwise stated
[2]Nail is a general description and may be T-head, modified round head or round head.
[3]Staples are 16-gauge wire, unless otherwise noted, and have a minimum 7/16-inch o.d. crown width.
[4]Staples shall be spaced at not more than 10 inches o.c. at intermediate supports for floors.

Use above information for questions 26-27

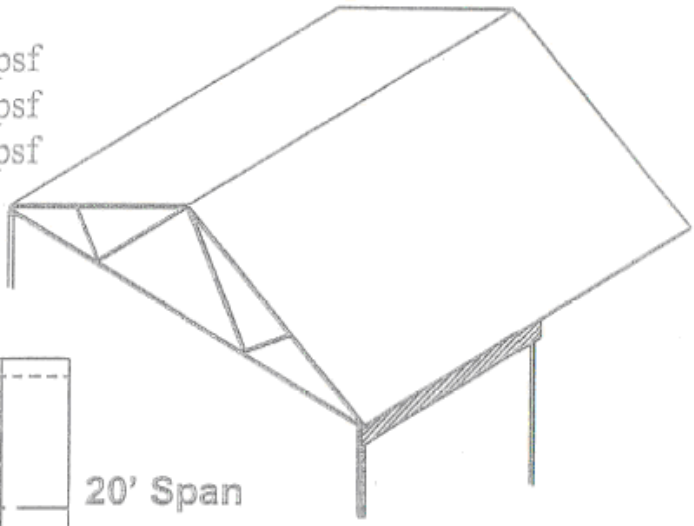
26. What is the minimum edge nailing for 7/16" OSB?
    a. 4"
    b. 6"
    c. 10"
    d. 12"

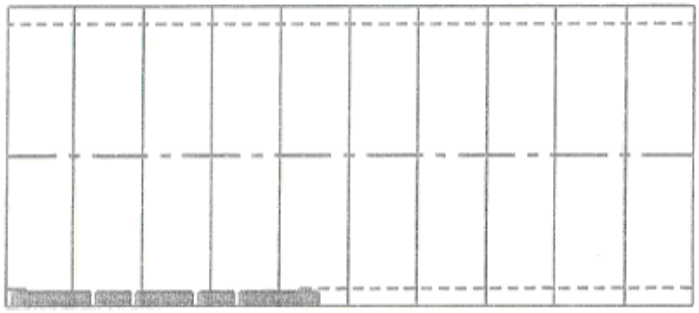
27. What is the minimum size fastener for question 26?
    a. 6d
    b. 8d
    c. 1 ½" staple
    d. Both a & c

Finding a Roof Header Load (Typical Example is a Garage Door Header)

Given:

Live load: _____ psf
Dead load: _____ psf
Total load: _____ psf
Truss span: 20 ft





Formula:

Header load (plf) = span carried x 0.5 x PSF

	Span Carried	X	0.5	X	PSF	=	Header Load
Live Load		X	0.5	X		=	
Total Load		X	0.5	X		=	

Span	X	0.5	X	PLF	=	
	X	0.5	X		=	

Notes

1. PLF-pounds per lineal foot
2. PSF-pounds per square foot
3. Always assume total load (both live load + dead load = total load) unless noted.

Use above information for questions 28-31 below

28. Pounds per lineal foot (plf) for the header load above would be _____ with the following loads, live load of 30 psf and a dead load of 15 psf. (note: truss span x .5 x total psf = _____)
    a. 540
    b. 425

c. 450
d. 600

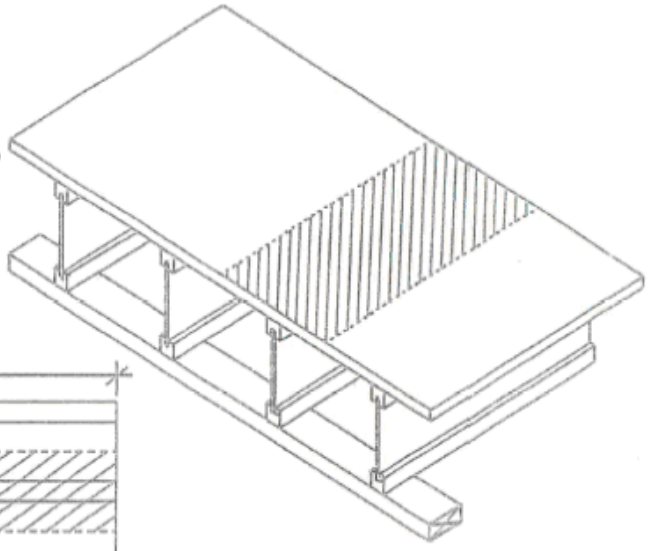
29. If the **header** span in question 28 was 16', what would the total header load be? (note: answer #28 x 16' = _____)
    a. 8640
    b. 6400
    c. 7200
    d. 8400

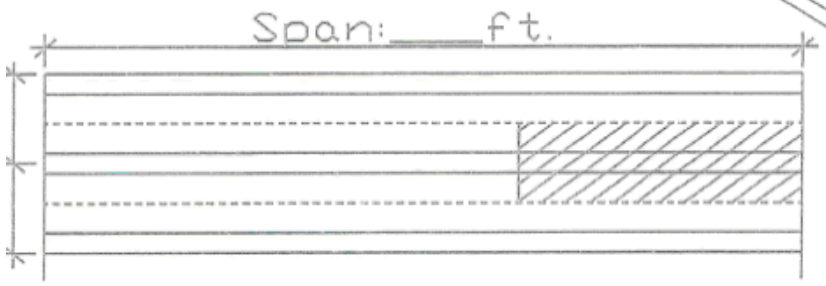
30. If question 28 had a 2' overhang added to each end, what would the plf be on this header? (note: truss span x .5 + 2' overhang x total psf = _____)
    a. 540
    b. 425
    c. 450
    d. 600

31. If question 29 had a 2' overhang added to each end, what would the total header load be? (note: answer #30 x 16' = _____)
    a. 8640
    b. 6400
    c. 7200
    d. 8400

Finding End Reaction -- Load at the End of a Joist or Rafter at Support - Example 2

Given: PSF and spacing
Floor Total Load _____ PSF
Spacing _____ ft o.c.





Formula:
End reaction = spacing x span x 0.5 x PSF

Spacing	X	Span	X	0.5	X	PSF	=	End Reaction
	X		X	0.5	X		=	

Use above information for questions 32-34 below

32. Calculate the end reaction for the above I joist using 40 lbs live load, 15 lbs dead load, 2' oc spacing, and a 16' span.
    a. 640
    b. 880
    c. 720
    d. 765

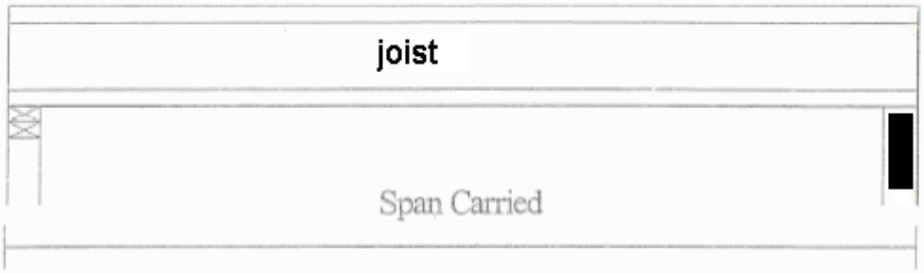
33. Calculate the end reaction for the above I joist using 40 lbs live load, 15 lbs dead load, 16" oc spacing, and a 16' span. (note: 16" oc equals 1.33')
    a. 640
    b. 680
    c. 585
    d. 765

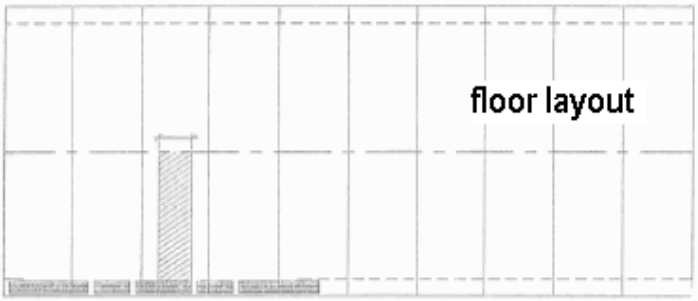
34. If the I- joist in question 32 terminates in a joist hanger, what minimum rating is required for that joist hanger?

a. 640
b. 880
c. 720
d. 765

Finding a Floor Header Load (PLF)

Given: Live load: _____psf
Dead load: _____psf
Total Load: _____psf





Header below

Formula:
Header load (plf) = span carried x 0.5 x PSF

	Span Carried	X	0.5	X	PSF	=	Header Load
Live Load		X	0.5	X		=	
Total Load		X	0.5	X		=	

Use above information for questions 35-39 below

35. Total pounds per lineal foot (plf) for the header load above would be _____ with the following loads. Live load of 40 psf, dead load of 10 psf, and a floor joist span of 14'. (note: span x .5 x total psf = _____)
    a. 350

b. 425
c. 450
d. 600

36. If the header span in question 35 was 16', what would the total header load be? (note: answer #35 x 16' = _____)
    a. 5600
    b. 4480
    c. 2240
    d. 7200

37. If the header span in question 35 was 16', what would the total **live load** be on this header?
    a. 5600
    b. 4480
    c. 7200
    d. 8400

38. If the header span in question 35 was 16', what would the total **dead load** be on this header?
    a. 1120
    b. 960
    c. 2240
    d. 1140

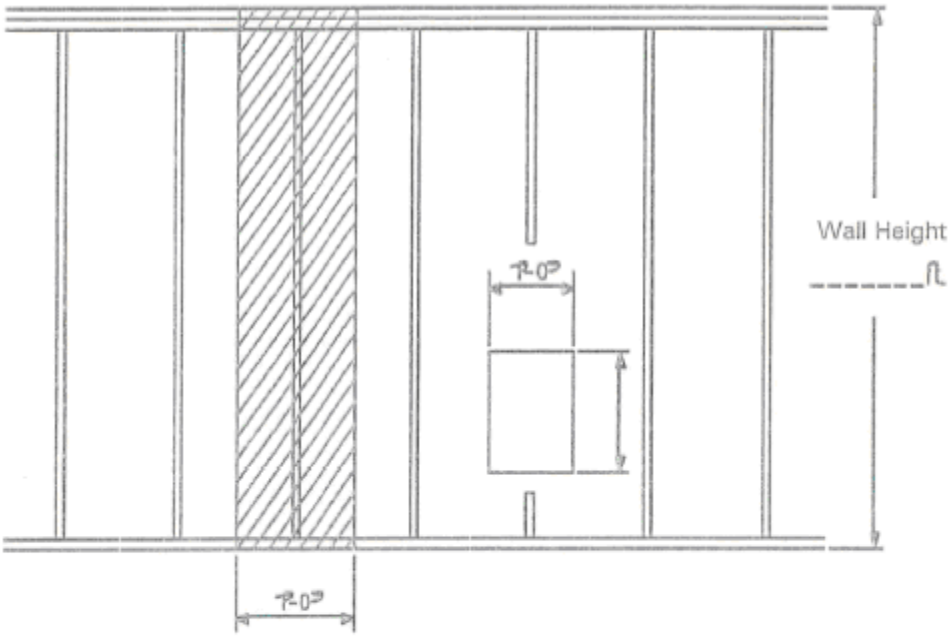
39. If the header span in question 35 was 16', what would the total end load be on each set of trimmer studs? (note: ½ the header load)
    a. 2800
    b. 2240
    c. 3600
    d. 4200

Dead Load Table for Walls

FRAME PARTITIONS	Movable steel partitions	4
	Wood or steel studs, ½-in gypsum board each side	8
	Wood studs, 2x4, unplastered	4
	Wood studs, 2x4, plastered one side	12
	Wood studs, 2x4, plastered two sides	20
FRAME WALLS	Exterior studs walls:	
	2x4 @ 16 in, 5/8" gypsum, insulated, 3/8-in siding	11
	2x6 @ 16 in, 5/8-in gypsum, insulated 3/8-in siding	12
	Windows, glass, frame and sash	8

Finding Wall Loads (PLF)

Given: Weight of wall = _____ psf
(includes weight of studs, sheathing, insulation, etc.).



Formula:
Wall load (plf) = wall height x PSF

Wall Height	X	PSF	=	Wall Load
	X		=	

Use above information for questions 40-41 below

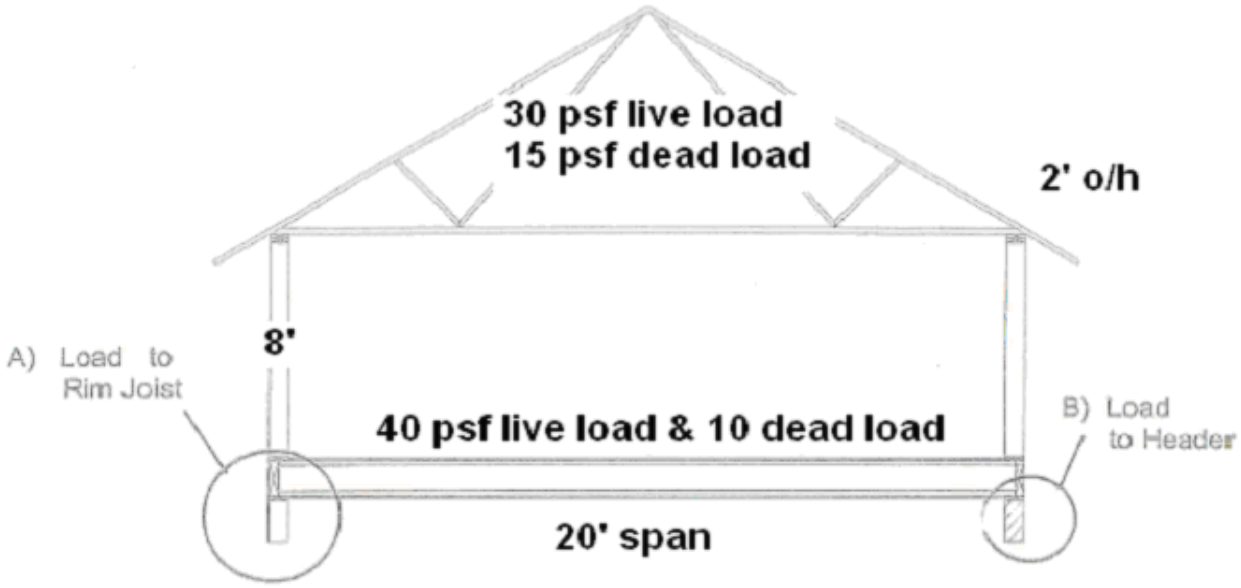
40. If the exterior wall above was 9' tall, 2" x 6" @16" oc, 5/8" rock, and insulated 3/8" siding, what would the plf be?
    a. 96
    b. 102
    c. 99
    d. 108

41. If the exterior wall above was 11' tall, 2" x 4" @ 16" oc, 5/8" rock, and insulated 3/8" siding, what would the plf be?
    a. 88
    b. 132

c. 121
d. 108

Finding Single-Story Loads (PLF)
(A) Load to Rim Joist
(B) Load to Header

Given: Weight of wall = 8 psf
(includes weight of studs, sheathing, insulation, etc..



Note: Use only 1/2 of the span for roof and floor loads.
Overhangs should be included in the roof loads.

Use above information for questions 42-45 below

42. What would the plf to the rim (A) be?
(note: include ½ roof span + overhang + wall loads only and don't include any floor load)
    a. 1104
    b. 604
    c. 514
    d. 800

43. If the load to header (B) had a 12' wide header, what would the plf be? (note: include floor load)
    a. 1104
    b. 604
    c. 514
    d. 800

44. If the load to header (B) had a 12' wide header, what would total header load be? (note: answer #43 x 12' = _____)
    a. 13248
    b. 7248
    c. 6168
    d. 8080

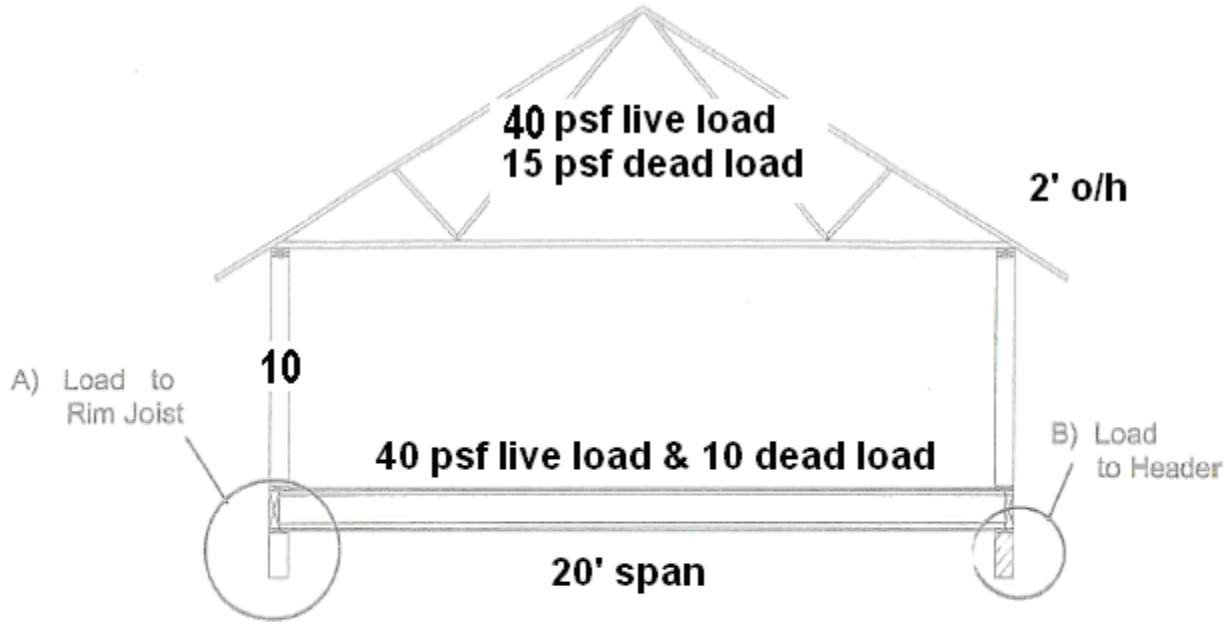
45. How much load would be on each set of trimmer studs in question 44? (note: ½ the header load)
    a. 6624
    b. 3624
    c. 3084
    d. 8080

Finding Single-Story Loads (PLF)

(A) Load to Rim Joist

(B) Load to Header

Given: Weight of wall = 10 psf
(includes weight of studs, sheathing, insulation, etc..



Note: Use only 1/2 of the span for roof and floor loads.
Overhangs should be included in the roof loads.

Use above information for questions 46-50 below

46. What would the plf to the rim a (A) be?
(note: include ½ roof span + overhang + wall loads only and don't include any floor load)
    a. 1770
    b. 1880
    c. 760
    d. 1960

47. What would the plf to the rim on the (B-side) be?
    a. 1770
    b. 1880
    c. 760
    d. 1960

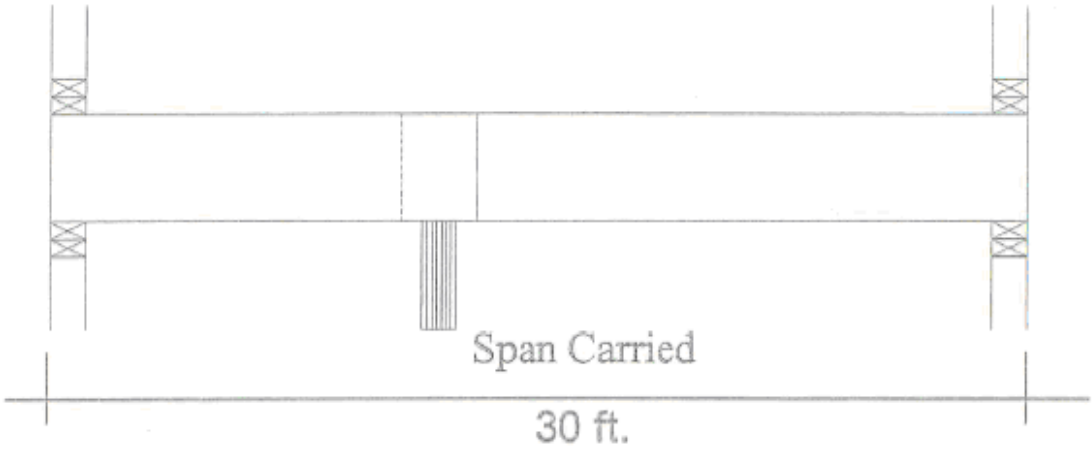
48. The plf for header (B) would be? (Note: now include the floor load)
    a. 1770
    b. 1880
    c. 1260
    d. 1960

49. If the load to header (B) had a 14' wide header, what would total header load be? (note: answer #48 x 14' = _____)
    a. 26320
    b. 24780
    c. 17640
    d. 26150

50. How much load would be on each set of trimmer studs in question 49? (Note: ½ the header load)
    a. 13160
    b. 12390
    c. 8820
    d. 13075

Finding Interior Floor Beams (PLF) case #1 Joists not Continuous

Given: Live load: **40** psf
Dead load: **15** psf
Total load: _____ psf



Note: The beam carries only 1/2 of the span or 15'. Each wall below carries ¼ of the span on each side.

Formula:

Load to beam (PLF) = span carried x 0.5 x PSF

	Span Carried	X	0.5	X	PSF	=	Load to Beam
Live Load		X	0.5	X		=	
Total Load		X	0.5	X		=	

Use above information for questions 51-54 below

51. What is the psf for this floor?
    a. 40
    b. 45
    c. 50
    d. 55

52. What is the plf live load on the center beam?
    a. 1200
    b. 600

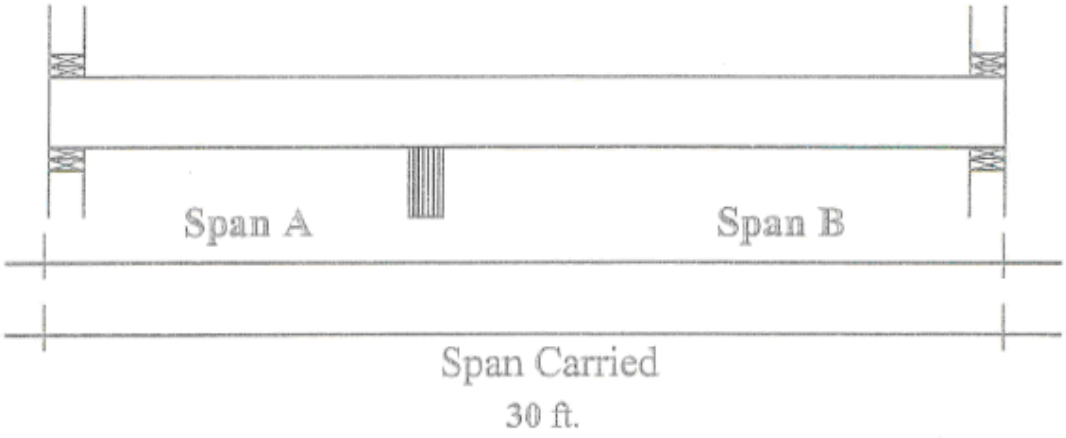
c. 825
d. 1650

53. What is the plf dead load on the center beam?
a. 450
b. 225
c. 825
d. 600

54. What is the plf total load on the center beam?
a. 1200
b. 600
c. 825
d. 1650

Finding Interior Floor Beams (PLF) case #2 Joists Continuous

Given: Live load: 40 psf
Dead load: 10 psf
Total load: _____ psf



Formula:

Load to beam (PLF) = span carried x 0.625 x PSF

	Span Carried	X	0.625	X	PSF	=	Load to Beam
Live Load		x	0.625	X		=	
Total Load		X	0.625	X		=	

Use above information for questions 55-58 below

55. What is the total psf for this floor?
    a. 40
    b. 45
    c. 50
    d. 55

56. What is the plf live load on the center beam?
    a. 1200
    b. 750
    c. 600
    d. None of the above

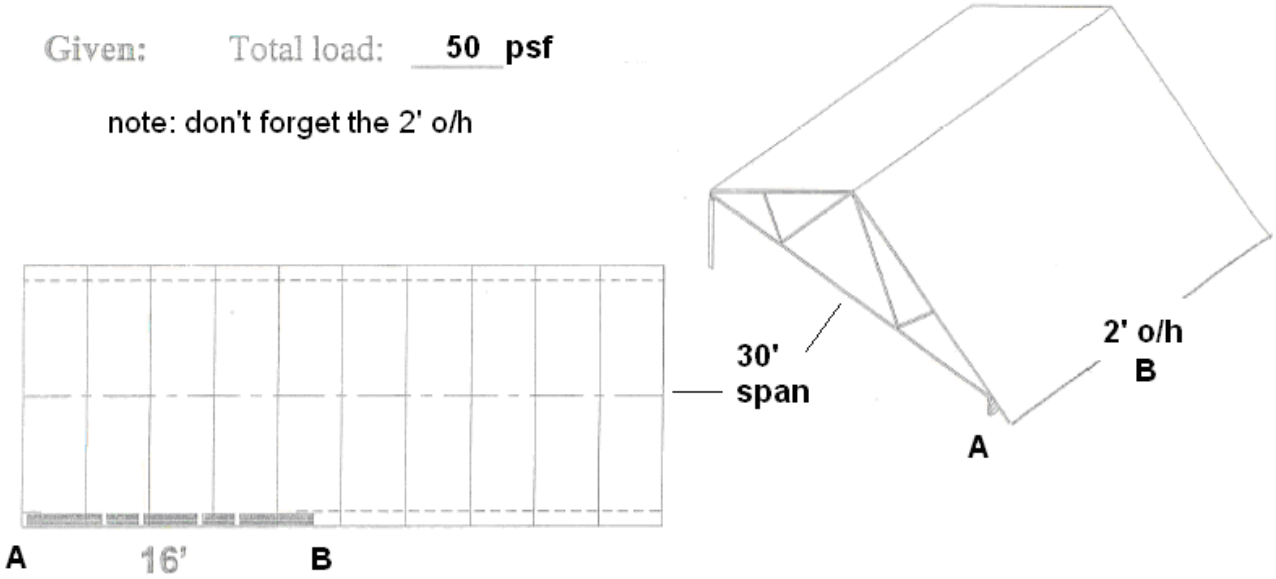
57. What is the plf dead load on the center beam?
    a. 45.25
    b. 187.5
    c. 82.5
    d. 90.75

58. What is the plf total load on the center beam?
    a. 1200
    b. 600
    c. 937.5
    d. 1650

Finding Beam or Header End Reaction - Load at Support at End of Beam

Given: Total load: **50 psf**

note: don't forget the 2' o/h



Formula:

End reaction (lbs) = beam span x 0.5 x PLF

Span	X	0.5	X	PLF	=	End Reaction
	X	0.5	X		=	

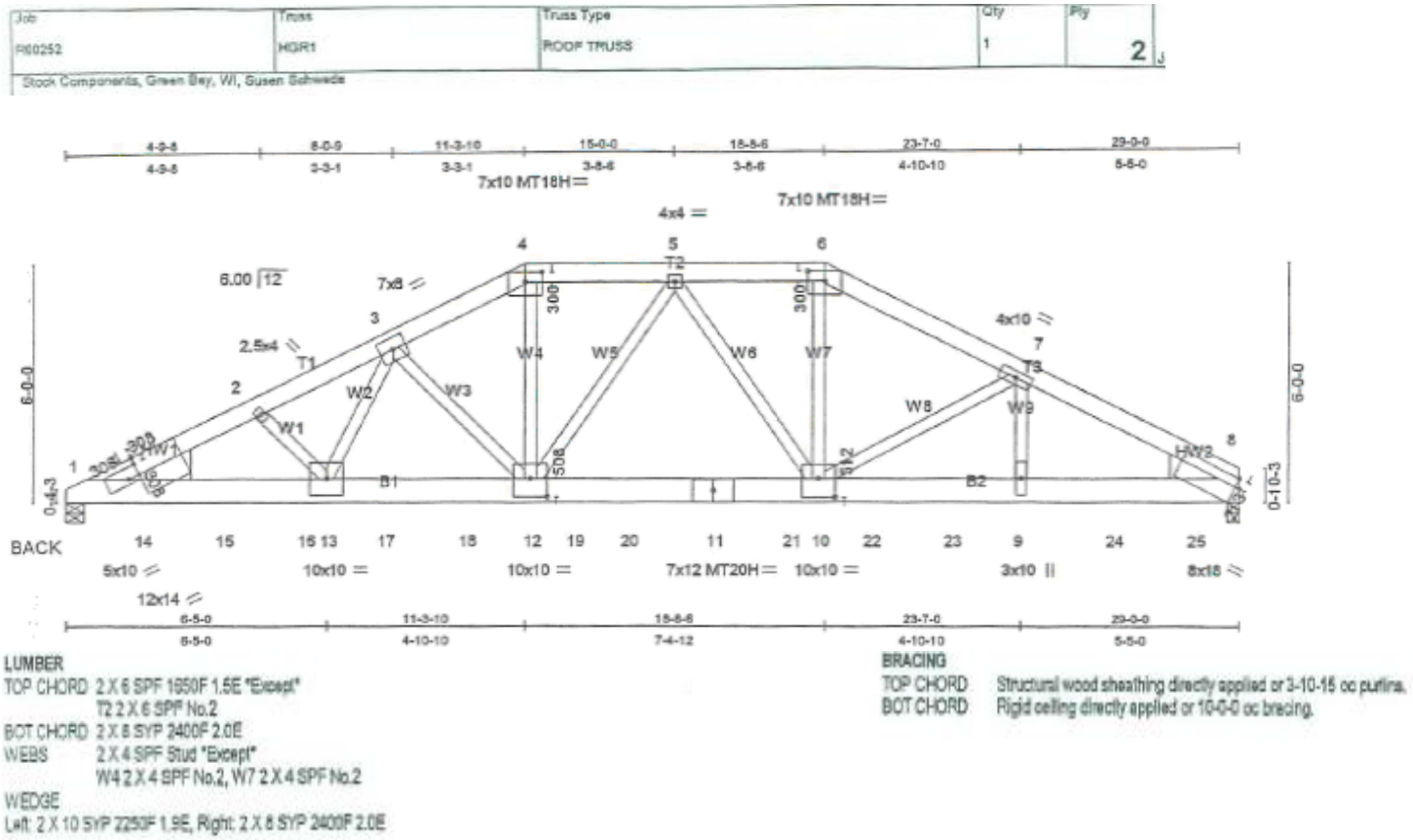
Use above information for questions 59-61 below

59. What is the total load at the end support (A)?
    a. 6000
    b. 6800
    c. 600
    d. 680

60. What is the total load at the end support (B)?
    a. 6000
    b. 6800
    c. 600
    d. 680

61. What is the total load on this header?
    a. 12000
    b. 13600
    c. 1200

d. 1360



Notes

2 ply truss to be connected together with 0.131" x 3" nails as follows:
Top chords (SPF) connected as follows: 2 x 6 - 2 rows at 0-9-0 oc.
Bottom chords (SYP) connected as follows: 2 x 8 - 2 rows at 0-7-0 oc.
Webs connected (SPF) as follows: 2 x 4 - 1 row at 0-9-0 oc.
Top Cord-structural wood sheathing applied or 3-10-15 oc purlins.

<u>Use above information for questions 62-74 below</u>

62. How many truss members are to be nailed together with the above information?
    a. 1
    b. 2
    c. 3
    d. 4
63. What size lumber was used for the top cord?
    a. 2" x 4"
    b. 2" x 6"
    c. Neither a or b
    d. Both a & b

64. What size lumber was used for the bottom cord?
    a. 2" x 6"

b. 2” x 8”
c. Neither a or b
d. Both a & b

65. What size lumber was used for the webs?
a. 2” x 4”
b. 2” x 6”
c. Neither a or b
d. Both a & b

66. Bracing for the top cord required by the above truss sheet would be?
a. Structural wood sheathing directly applied
b. Purlins at 3-10-15 oc
c. None of the above
d. Both a & b

67. What is the minimum nailing requirement for the bottom cord?
a. 3 rows at 0-7-0 oc
b. 2 rows at 0-7-0 oc
c. 1 row at 0-7-0 oc
d. 6 rows at 0-7-0 oc

68. What is the minimum nailing requirement for the top cord?
a. 3 rows at 0-9-0 oc
b. 2 rows at 0-7-0 oc
c. 1 row at 0-9-0 oc
d. none of the above

69. What is the minimum nailing requirement for the webs?
a. 3 rows at 0-9-0 oc
b. 2 rows at 0-9-0 oc
c. 1 row at 0-7-0 oc
d. none of the above

70. What is the total height of the truss?
a. 5’
b. 6’
c. 7’
d. 60”

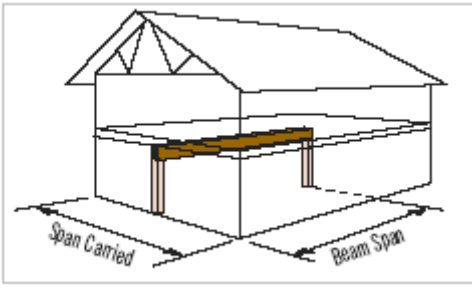
71. If the __-__-__ stands for feet-inches-fraction of inch in 16^{th}, what does 3-10-15 above stand for?
a. 3’10”
b. 3’10” 15/32
c. 3’10 -15/16”
d. 4’

72. What species of lumber is noted above for the top cord?
a. Douglas Fir
b. SPF
c. SYP

d. Oak

73. What species of lumber is noted above for the bottom cord?
    a. Douglas Fir
    b. SPF
    c. SYP
    d. Oak

74. What species of lumber is noted above for the webs?
    a. Douglas Fir
    b. SPF
    c. SYP
    d. Oak



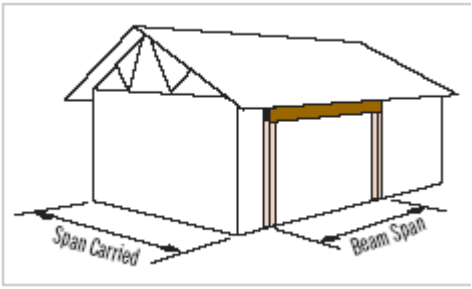
FOR FLOOR JOISTS THAT ARE CONTINUOUS (ONE PIECE) (40 PSF LIVE, 15 PSF DEAD, 100%)

Beam Span (ft)	Beam Width	Span Carried By Beam (ft)										
		20	22	24	26	28	30	32	34	36	38	40
8	3-1/2"	7-1/4"	7-1/4"	7-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"
	5-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	9-1/4"	9-1/4"
10	3-1/2"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"
	5-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"
12	3-1/2"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-7/8"	11-7/8"	14"	14"	14"	14"	14"
	5-1/4"	9-1/4"	9-1/4"	9-1/2"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"
14	3-1/2"	11-7/8"	14"	14"	14"	14"	14"	16"	16"	16"	16"	16"
	5-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-7/8"	11-7/8"	11-7/8"	14	14"	14"	14"
16	3-1/2"	14"	14"	16"	16"	16"	16"	18"	18"	18"	18"	18"
	5-1/4"	11-7/8"	14"	14"	14"	14"	14"	14"	14"	14"	14"	16"
18	3-1/2"	16"	16"	18"	18"	18"	18"	-	-	-	-	-
	5-1/4"	14"	14"	14"	14"	16"	16"	16"	16"	16"	16"	16"
20	3-1/2"	18"	18"	18"	-	-	-	-	-	-	-	-
	5-1/4"	16"	16"	16"	16"	16"	16"	18"	18"	18"	18"	18"

Use above information for questions 75-76 below

75. A beam span of 18’ with a 24’ floor joist span, what would the minimum beam size be?
    a. 5 ¼” x 14”
    b. 3 ½” x 18”
    c. Neither a or b
    d. Both a & b

76. A beam span of 20’ with a 34’ floor joist span, what would the minimum beam size be?
    a. 5 ¼” x 14”
    b. 3 ½” x 18”
    c. 5 ¼” x 18”
    d. 2 ply 2” x 6”



ROOF: 30 PSF LIVE
15 PSF DEAD
115% SNOW

Beam Span (ft)	Beam Width	Span Carried By Beam (ft)										
		20	22	24	26	28	30	32	34	36	38	40
8	3-1/2"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"
	5-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"
10	3-1/2"	7-1/4"	7-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"
	5-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"	9-1/4"	9-1/4"
12	3-1/2"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/2"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"
	5-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"
14	3-1/2"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-7/8"	11-7/8"	14"	14"	14"	14"
	5-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/4"	9-1/2"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"
16	3-1/2"	11-1/4"	11-7/8"	11-7/8"	14"	14"	14"	14"	14"	16"	16"	16"
	5-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-1/4"	11-7/8"	11-7/8"	11-7/8"	14"
18	3-1/2"	14"	14"	14"	14"	16"	16"	16"	16"	18"	18"	18"
	5-1/4"	11-1/4"	11-7/8"	11-7/8"	11-7/8"	14"	14"	14"	14"	14"	14"	14"

Use above information for questions 77-78

77. A beam span of 18’ with a 24’ roof truss span, what would the minimum beam size be?
    a. 3 1/2” x 14”
    b. 5 1/4” x 11 7/8”
    c. Neither a or b
    d. Both a & b

78. A beam span of 16’ with a 40’ roof truss span, what would the minimum beam size be?
    a. 5 ¼” x 18”
    b. 3 ½” x 16”
    c. 5 ¼” x 14”
    d. Both b & c

Table 9. U-Values for Windows, Glazed Doors, and Skylights[a]

Frame/Glazing Features	Single Pane	Double Pane
Metal Without Thermal Break		
Operable	1.27	0.87
Fixed	1.13	0.69
Garden Window	2.60	1.81
Curtain Wall	1.22	0.79
Door	1.26	0.80
Skylight	1.98	1.31
Site-Assembled Skylight	1.36	0.82
Metal With Thermal Break		
Operable	1.08	0.65
Fixed	1.07	0.63
Curtain Wall	1.11	0.68
Door	1.10	0.66
Skylight	1.89	1.11
Site-Assembled Skylight	1.25	0.70
Reinforced Vinyl or Metal-Clad Wood		
Operable	0.90	0.57
Fixed	0.98	0.56
Door	0.99	0.57
Skylight	1.75	1.05
Wood/Vinyl/Fiberglass		
Operable	0.89	0.55
Fixed	0.98	0.56
Garden Window	2.31	1.61
Door	0.98	0.56
Skylight	1.47	0.84
Glass Block Assemblies	0.60	

(a) The U-values in these tables can be used in the absence of test U-values. The product cannot receive credit for a feature that cannot be clearly detected. Where a composite of materials from two different product types is used, the product must be assigned the higher U-value.

Use above information for questions 79-81 below

79. What is the U value for a metal door with a thermal break and a single pane window?
    a. 1.26
    b. .80
    c. 1.10
    d. .66

80. What is the U value for a skylight without a thermal break and single glaze?
    a. 1.98
    b. 1.31
    c. 1.75
    d. 1.05

81. What is the U value for a wood core door with a storm window (2 layers)?
    a. .56

b. .32
c. .40
d. .26

Typical Thermal Properties of Building Materials--Design Values[a]

Description	Density, lb/ft³	Resistance (R) Per Inch Thickness °F . ft² . h	Resistance (R) For Thickness Listed
SHEATHING			
Gypsum or plaster board 1/2".	50	--	0.45
Gypsum or plaster board 5/8".	50	--	0.56
Plywood (Douglas Fir) 1/2".	34	--	0.62
Plywood (Douglas Fir) 5/8".	34	--	0.77
Plywood or wood panels 3/4".	34	--	0.93
Vegetable fiber board			
Sheathing, regular density 1/2".	18	--	1.32
Hardboard			
Medium density	50	1.37	--
Particleboard			
Medium density	50	1.06	--
FINISH FLOORING MATERIALS			
Carpet and rubber pad	--	--	1.23
INSULATING MATERIALS			
Blanket and Batt			
Mineral fiber, fibrous form processed from rock, slag, or glass			
approx. 3-4 in.	0.4-2.0	--	11
approx. 3.5 in.	0.4-2.0	--	13
approx. 3.5 in.	1.2-1.6	--	15
approx. 5.5-6.5 in.	0.4-2.0	--	19
approx. 5.5 in.	0.6-1.0	--	21
approx. 6-7.5 in.	0.4-2.0	--	22
approx. 8.25-10 in.	0.4-2.0	--	30
approx. 10-13 in.	0.4-2.0	--	38
Board and Slabs			
Glass fiber, organic bonded	4.0-9.0	4.00	--
Expanded polystyrene, extruded (smooth skin surface)	1.8-3.5	5.00	--
Expanded polystyrene, molded beads	1.0	3.85	--
	1.25	4.00	--
	1.5	4.17	--
	1.75	4.17	--
	2.0	4.35	--
Cellular polyurethane/polyisocyanurate	1.5	6.25-5.56	--
Cellular polyisocyanurate (CFC-11 exp.) (gas-impermeable facers)	2.0	7.04	--
Mineral fiberboard, wet felted			
Acoustical tile	18.0	2.86	--
Loose Fill			
Cellulosic insulation (milled paper or wood pulp)	2.3-3.2	3.70-3.13	--
Perlite, expanded	2.0-4.1	3.7-3.3	--
	4.1-7.4	3.3-2.8	--
	7.4-11.0	2.8-2.4	--
Mineral fiber (rock, slag, or glass)			
approx. 3.75-5 in.	0.6-2.0	--	11.0
approx. 6.5-8.75 in.	0.6-2.0	--	19.0
approx. 7.5-10 in.	0.6-2.0	--	22.0
approx. 10.25-13.75 in.	0.6-2.0	--	30.0
Mineral fiber (rock, slag, or glass)			
approx. 3.5 in. (closed sidewall application)	2.0-3.5	--	12.0-14.0
Vermiculite, exfoliated	7.0-8.2	2.13	--
	4.0-6.0	2.27	--
Spray Applied			
Polyurethane foam	1.5-2.5	6.25-5.56	--
Ureaformaldehyde foam	0.7-1.6	4.55-3.57	--
Cellulosic fiber	3.5-6.0	3.45-2.94	--
Glass fiber	3.5-4.5	3.85-3.70	--
ROOFING			
Asphalt shingles	70	--	0.44
PLASTERING MATERIALS			
Cement plaster, sand aggregate	116	0.20	--
0.75 in.	--	--	0.15

Use above information for questions 82-84 below

82. What is the R value for a blanket of mineral fiber at 5.5" with the density of 0.6-1.0?
    a. 19
    b. 21
    c. 22
    d. 15

83. What is the R value for ¾" plywood?
    a. .56
    b. .62
    c. .77
    d. .93

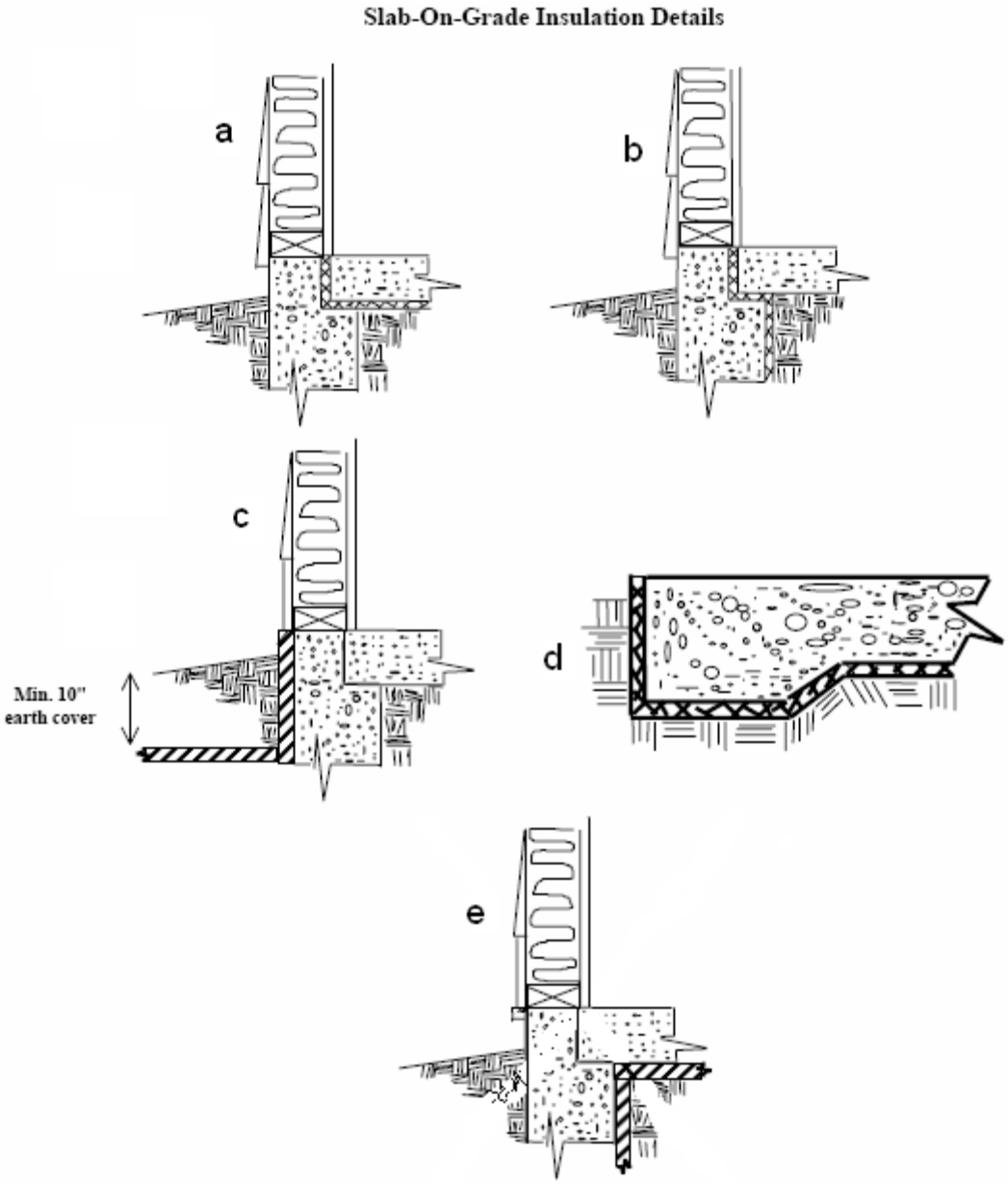
84. What is the R value for asphalt singles?
    a. .44
    b. .15
    c. .32
    d. .65

Table 8. Crawl Space Wall U-Values

Insulation R-Value	Crawl Space Wall U-Value
R-0	0.477
R-1	0.313
R-2	0.235
R-3	0.189
R-4	0.158
R-5	0.136
R-6	0.120
R-7	0.107
R-8	0.096
R-9	0.088
R-10	0.081
R-11	0.075
R-12	0.069
R-13	0.065
R-14	0.061
R-15	0.057
R-16	0.054
R-17	0.051
R-18	0.049
R-19	0.047
R-20	0.045

85. What is the R value for a crawl space wall with a U value of .049?
    a. 17

b. 18
c. 19
d. 20



Insulation shall extend vertically and horizontally for a total of 48". In all cases the insulation shall insulate to the top edge of the floor perimeter. The last diagram is not an acceptable method.

Use above information for question 86

86. Which example above meets the intent of the code?
a. Both a & b

b. Both c & d
c. e only
d. a, b, c, & d

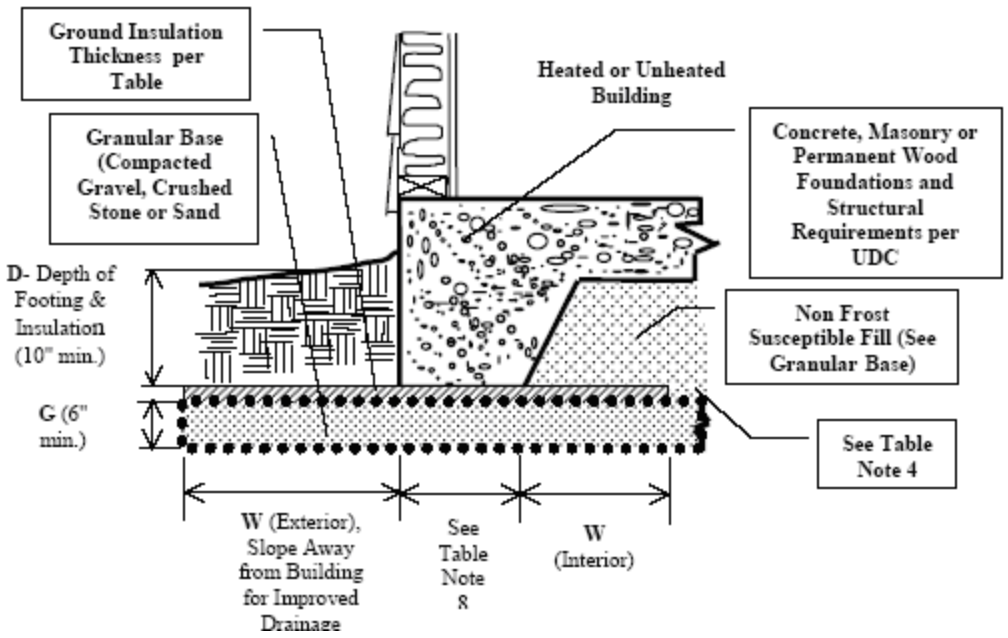
Frost Protected Shallow Footings

In lieu of frost walls, the following is an acceptable method.

Minimum Ground Insulation Requirements (1)

		Mean Annual Temperature (2, 6)			Minimum Footing Depth (7, 8)	
Air Freezing Index (F-days) (3)	W-Insulation Width from Edge of Footing (4, 5)	38	40	≥41	D-Concrete Depth	G-Granular Base Thickness
2250 or less	63"	NA	NA	2.5"	10"	6"
2251 - 3000	79"	4"	3.5"	3.5"	10"	6"
3001 - 3750	91"	5"	NA	NA	10"	6"

Notes:
1. Also see s. Comm 22.26 for additional slab-edge insulation requirements.
2. Units are degrees Fahrenheit. See estimate provided on Mean Annual Temperature Contour Map.
3. Air freezing index shall be based on maximum year expected for a 100 year return period. See estimate provided on AFI Contour Map.
4. Ground insulation to the building interior can be extended beneath the entire slab where it is desired to protect the entire slab from frost heave action.
5. Ground insulation to the building interior can be in one horizontal plane (as shown in the detail) and covered with non frost-susceptible fill or the insulation maybe placed directly beneath the slab.
6. Insulation thickness recommendations are for extruded polystyrene (XPS) insulation.
7. The minimum depth of concrete footing and horizontal insulation is 10". A 6" drainage layer is required under the insulation.
8. Insulation placed directly beneath the footing shall be Type IV or Type VI XPS in accordance with ASTM C578. Maximum deadload placed on the Type IV insulation shall be 1200 pounds/square foot. Maximum deadload placed on Type VI shall be 1900 psf.



Use above information for questions 87-90 below

87. When install a frost protected shallow footing foundation, what is the minimum footing depth?
a. 8”
b. 10”
c. 12”

d. 24”

88. Using the information for question 87, what is the minimum required drainage layer under the insulation?
    a. 10”
    b. 6”
    c. 8”
    d. 12”
89. If the air freezing index is 2251-3000, what is the minimum width of the insulation from the footing edge required?
    a. 63”
    b. 78”
    c. 81”
    d. None of the above

90. If the air freezing index is 2251-3000 and Mean Annual Temperature > 41, what is the minimum thickness of the insulation required?
    a. 2.5”
    b. 3.5”
    c. 5”
    d. None of the above

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PETITION FOR VARIANCE
INFORMATION AND INSTRUCTIONS - ILHR 3

In instances where exact compliance with a particular code requirement cannot be met or alternative designs are desired, the Division has a petition for variance program where it reviews and considers acceptance of alternatives which are not in strict conformance with the letter of the code, but which meet the intent of the code. **A variance is not a waiver from a code requirement.** The petitioner must **provide an equivalency which meets the intent** of the code section petitioned to obtain a variance. Documentation of the rationale for the equivalency is requested below. Failure to provide adequate information may delay your petition. Pictures, sketches, and plans may be submitted to support equivalency. If the proposed equivalency does not adequately safeguard the health, safety, and welfare of building occupants, frequenters, firefighters, etc., the variance request will be denied. NOTE: A SEPARATE PETITION IS REQUIRED FOR EACH BUILDING AND EACH CODE ISSUE PETITIONED (i.e., 57.13 window issue cannot be processed on the same petition as 51.16 stair issue). It should be noted that **a petition for variance does not take the place of any required plan review submittal.**

The Division is unable to process petitions for variance that are not properly completed. Before submitting the application, the following items should be checked for completeness in order to avoid delays:

- Petitioner's name (typed or printed)
- Petitioner's signature
- The Petition For Variance Application must be signed by the owner of the building or project unless a Power of Attorney is submitted.
- Notary Public signature with affixed seal
- Analysis to establish equivalency, including any pictures, illustrations or sketches of the existing and proposed conditions to clearly convey your proposal to the reviewer.
- Proper fee
- Any required position statements by fire chief or municipal official

  A position statement from the chief of the local fire department is required for fire safety issues. **No position statement is required for** non-fire safety topics such as sanitary and energy conservation. Position statements for both the fire department and municipality are required for ILHR 69 barrier-free petitions. For rules relating to one- and two-family dwellings, only a position statement from the local enforcing municipality is required. Position statements must be completed and signed by the appropriate fire chief or municipal enforcement official. See the back of SBD-9890, Petition For Variance Application form for these position statement forms. Signatures or seals on all documents must be originals. Photocopies are not acceptable.

SBD-9890 (R.01/98)

Use above information for questions 91-105below

91. A variance is considered a waiver from meeting the code requirement?

a. True
b. False

92. A variance allows the petitioner to provide an equivalent method that meets the intent of the code?
    a. True
    b. False

93. Pictures, sketches, and plan shall be submitted to support the equivalency.
    a. True
    b. False

94. If the proposed equivalency does not adequately safeguard the health, safety, and welfare of the building occupants, frequenter, firefighters, etc., the variance request will be denied.
    a. True
    b. False

95. It should be noted that a petition for variance does not take the place of any required plan review submittal.
    a. True
    b. False

96. If several building plans are exactly the same, a separate petition is not required for each building.
    a. True
    b. False

97. The Division is unable to process petitions for variance that are not properly complete. Before submitting the application, the following items should be checked for completeness in order to avoid delays.
    a. Builders name
    b. Builders signature
    c. Fees calculated and billed at a later date
    d. None of the above

98. A petition for variance shall be notarized.
    a. True
    b. False

99. A position statement is required by the chief of the local fire department for fire safety issues.
    a. True
    b. False

100. No position statement is required from the Fire Chief if only non-fire safety topics such as sanitary and energy conservation issues are in question.
    a. True
    b. False

101. If ILHR 69 barrier-free issues are the only concern, a Position Statement is required from?
    a. Fire department
    b. Municipality
    c. Both a & b
    d. Neither a or b

102. One and two family dwellings only need a position statement for the fire department.
   a. True
   b. False

103. The form number for the Petition for Variance is?
   a. SBD-9890
   b. SBD 5823
   c. SBD 5824
   d. None of the above

104. Photo copies are acceptable when filing a Petition of Variance to the Division.
   a. True
   b. False

105. The seals or signatures on all Petition of Variance documents submit to the Division must be originals.
   a. True
   b. False

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Contact numbers and fees for the Division's review of the petition for variance are as follows:

Chapters ILHR 20-25, Uniform Dwelling Code	(608) 267-5113	$125.00
Chapters ILHR 67-68, Rental Unit Energy Efficiency Code	(608) 266-1930	$125.00
Chapters ILHR 50-64, Commercial Building Code	(608) 266-1835	$490.00
Chapter ILHR 66, Uniform Multi-Family Dwellings	(608) 266-0669	$490.00

- The cities of Milwaukee and Madison may process requests for variances from Chapters ILHR 50 through 64 requirements on projects in their jurisdiction.)

Chapter ILHR 66, Multifamily Dwelling	(608) 266-1930	$490.00
Chapter ILHR 69, Barrier-Free Requirements	(414) 548-8609	$200.00
Chapter ILHR 70, Historic Building Code	(715) 524-3626	$300.00
All Other Chapters		$200.00

Boilers and Pressure Vessels	(414) 548-8617
Electrical	(608) 266-7529
Elevators	(414) 521-5444
Flammable Liquids	(608) 266-7529

Priority Review: Does not apply to Uniform Dwelling Code or Historic Building Code issues which already are treated as a priority. ... Double Above Amounts

Except for special cases, the Division will review and make a determination on a petition for variance within 30 business days of receipt of all calculations, documents, and fees required for the review. Uniform Dwelling Code petitions will be processed within 5 business days. Priority petitions will be processed within 10 business days.

Use above information for questions 106-108 below

106. The Division will make a determination on a petition for variance (not a special case) within how many business days?
   a. 10
   b. 5
   c. 30
   d. None of the above

107. The Division will process a petition for variance (Uniform Dwelling Code) within how many business days?
   a. 10
   b. 5
   c. 30
   d. None of the above

108. The Division will process a petition for variance (priority petition) within how many business days?
   a. 10
   b. 5
   c. 30
   d. None of the above

Tables are reprinted courtesy of American Forest & Paper Association.

Table No.	Member Type	Live Load (psf)	Dead Load (psf)	Condition	(Deflection)*
F-2	Floor Joists	40	10	-	L/360
C-1	Ceiling Joists	10	5	Drywall ceiling, no attic storage	L/240
C-2	Ceiling Joists	20	10	Attic storage	L/240
R-2	Roof Rafters	30 (Zone 2)	10	Maximum 2 layers of asphalt shingles or wood shakes/shingles	L/240
R-3	Roof Rafters	40 (Zone 1)	10	Maximum 2 layers of asphalt shingles or wood shakes/shingles	L/240
R-10	Roof Rafters	30 (Zone 2)	20	Heavy roof covering (clay tile)	L/240
R-11	Roof Rafters	40 (Zone 1)	20	Heavy roof covering (clay tile)	L/240
R-14	Roof Rafters	30 (Zone 2)	10	Maximum 2 layers of asphalt shingles or wood shakes/shingles	L/180
R-15	Roof Rafters	40 (Zone 1)	10	Maximum 2 layers of asphalt shingles or wood shakes/shingles	L/180
R-22	Roof Rafters	30 (Zone 2)	20	Heavy roof covering (clay tile)	L/180
R-23	Roof Rafters	40 (Zone 1)	20	Heavy roof covering (clay tile)	L/180

*Deflection criteria are optional. For roof rafters with drywall on the underside, use the stricter L/240 tables to limit deflection.

Use above information for questions 109-114 below

109. What is the recommended deflection for a ceiling joist with a drywall ceiling and no attic storage?
   a. L/180
   b. L/240
   c. L/360
   d. L/480

110. What is the recommended deflection for roof rafters with drywall on the underside?
   a. L/180
   b. L/240
   c. L/360
   d. L/480

111. What is the recommended live load for a ceiling joist with a drywall ceiling and no attic storage?
   a. 10
   b. 20
   c. 30
   d. 40

112. What is the required live load for a roof rafter in zone 1, heavy roof covering, and a deflection of L/240?
   a. 10

b. 20
c. 30
d. 40

113. What is the required live load for a roof rafter in zone 2, heavy roof covering, and a deflection of L/240?
a. 10
b. 20
c. 30
d. 40

114. According to the chart, how many layers of asphalt shingles are allowed?
a. 1
b. 2
c. 3
d. 4

Section Comm 21.27 allows reduction of the snow live load for roof slopes greater than 30 degrees (7/12 slope) based on the formula Cs = 1 - (a-30)/40, where "a" is the slope of the roof expressed in degrees. Following is a table of tabulated values for certain roof slopes.

Rafter Slope	Angle in Degrees	Zone 1 Live Load (psf)	Zone 2 Live Load (psf)
7/12	30	40	30
10/12	40	30	22.5
12/12	45	25	18.8
14/12	50	20	15

Use above information for questions 115-116 below

115. According to the chart, what is the live load in zone 2 for a 12/12 rafter slope?
a. 30
b. 22.5
c. 18.8
d. None of the above

116. According to the chart, what is the live load in zone 1 for a 7/12 rafter slope?
a. 30
b. 22.5
c. 18.8
d. None of the above

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TABLE F- 2
FLOOR JOISTS WITH L/360 DEFLECTION LIMITS

DESIGN CRITERIA:
Deflection - For 40 psf live load.
Limited to span in inches divided by 360.
Strength - Live load of 40 psf plus dead load
of 10 psf determines the required bending design value.

Joist Size (in)	Spacing (in)	Modulus of Elasticity, E, in 1,000,000 psi																
		0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
2x 6	12.0	8- 6	8-10	9- 2	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	10-11	11- 2	11- 4	11- 7	11- 9	11-11	12- 1	12- 3
	16.0	7- 9	8- 0	8- 4	8- 7	8-10	9- 1	9- 4	9- 6	9- 9	9-11	10- 2	10- 4	10- 6	10- 8	10-10	11- 0	11- 2
	19.2	7- 3	7- 7	7-10	8- 1	8- 4	8- 7	8- 9	9- 0	9- 2	9- 4	9- 6	9- 8	9-10	10- 0	10- 2	10- 4	10- 6
	24.0	6- 9	7- 0	7- 3	7- 6	7- 9	7-11	8- 2	8- 4	8- 6	8- 8	8-10	9- 0	9- 2	9- 4	9- 6	9- 7	9- 9
2x 8	12.0	11- 3	11- 8	12- 1	12- 6	12-10	13- 2	13- 6	13-10	14- 2	14- 5	14- 8	15- 0	15- 3	15- 6	15- 9	15-11	16- 2
	16.0	10- 2	10- 7	11- 0	11- 4	11- 8	12- 0	12- 3	12- 7	12-10	13- 1	13- 4	13- 7	13-10	14- 1	14- 3	14- 6	14- 8
	19.2	9- 7	10- 0	10- 4	10- 8	11- 0	11- 3	11- 7	11-10	12- 1	12- 4	12- 7	12-10	13- 0	13- 3	13- 5	13- 8	13-10
	24.0	8-11	9- 3	9- 7	9-11	10- 2	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11	12- 1	12- 3	12- 6	12- 8	12-10
2x10	12.0	14- 4	14-11	15- 5	15-11	16- 5	16-10	17- 3	17- 8	18- 0	18- 5	18- 9	19- 1	19- 5	19- 9	20- 1	20- 4	20- 8
	16.0	13- 0	13- 6	14- 0	14- 6	14-11	15- 3	15- 8	16- 0	16- 5	16- 9	17- 0	17- 4	17- 8	17-11	18- 3	18- 6	18- 9
	19.2	12- 3	12- 9	13- 2	13- 7	14- 0	14- 5	14- 9	15- 1	15- 5	15- 9	16- 0	16- 4	16- 7	16-11	17- 2	17- 5	17- 8
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2x12	12.0	17- 5	18- 1	18- 9	19- 4	19-11	20- 6	21- 0	21- 6	21-11	22- 5	22-10	23- 3	23- 7	24- 0	24- 5	24- 9	25- 1
	16.0	15-10	16- 5	17- 0	17- 7	18- 1	18- 7	19- 1	19- 6	19-11	20- 4	20- 9	21- 1	21- 6	21-10	22- 2	22- 6	22-10
	19.2	14-11	15- 6	16- 0	16- 7	17- 0	17- 6	17-11	18- 4	18- 9	19- 2	19- 6	19-10	20- 2	20- 6	20-10	21- 2	21- 6
	24.0	13-10	14- 4	14-11	15- 4	15-10	16- 3	16- 8	17- 0	17- 5	17- 9	18- 1	18- 5	18- 9	19- 1	19- 4	19- 8	19-11
F_b	12.0	718	777	833	888	941	993	1043	1092	1140	1187	1233	1278	1323	1367	1410	1452	1494
F_b	16.0	790	855	917	977	1036	1093	1148	1202	1255	1306	1357	1407	1456	1504	1551	1598	1644
F_b	19.2	840	909	975	1039	1101	1161	1220	1277	1333	1388	1442	1495	1547	1598	1649	1698	1747
F_b	24.0	905	979	1050	1119	1186	1251	1314	1376	1436	1496	1554	1611	1667	1722	1776	1829	1882

Use above information for questions 117-118 below

117. A 2" x 10" that spans 15' 8" and is 16" on center would have a modulus of Elasticity of?
   a. 1.2
   b. 1.3
   c. 1.4
   d. 1.5

118. A 2" x 10" that spans 15' 8" and is 16" on center would have an Fb value of?
   a. 1043
   b. 1148
   c. 1220
   d. 1093

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Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Spruce-Pine-Fir					
Select Structural	2x4	2155	2480	1,500,000	NLGA
No.1 /No.2		1510	1735	1,400,000	
No.3		865	990	1,200,000	
Stud		855	980	1,200,000	
Construction		1120	1290	1,300,000	
Standard		635	725	1,200,000	
Utility		290	330	1,100,000	
Select Structural	2x6	1870	2150	1,500,000	
No.1 /No.2		1310	1505	1,400,000	
No.3		750	860	1,200,000	
Stud		775	895	1,200,000	
Select Structural	2x8	1725	1985	1,500,000	
No. 1 / No.2		1210	1390	1,400,000	
No.3		690	795	1,200,000	
Select Structural	2x10	1580	1820	1,500,000	
No.1/No.2		1105	1275	1,400,000	
No.3		635	725	1,200,000	
Select Structural	2x12	1440	1655	1,500,000	
No.1 /No.2		1005	1155	1,400,000	
No.3		575	660	1,200,000	

Floor Roof

119. Using the information from questions 117 and 118, what minimum grade of SPF would be allowed (lowest quality)?
   a. Select structural
   b. No 1
   c. Both a & b
   d. No 2

120. Replace the above information in questions 117-119 with a 2” x 12”, what minimum grade of SPF would be allowed (lowest quality)?
   a. Select structural
   b. Both a & c
   c. No 3
   d. No 2

Construction 120

1	a	b	c	d	41	a	b	c	d	81	a	b	c	d
2	a	b	c	d	42	a	b	c	d	82	a	b	c	d
3	a	b	c	d	43	a	b	c	d	83	a	b	c	d
4	a	b	c	d	44	a	b	c	d	84	a	b	c	d
5	a	b	c	d	45	a	b	c	d	85	a	b	c	d
6	a	b	c	d	46	a	b	c	d	86	a	b	c	d
7	a	b	c	d	47	a	b	c	d	87	a	b	c	d
8	a	b	c	d	48	a	b	c	d	88	a	b	c	d
9	a	b	c	d	49	a	b	c	d	89	a	b	c	d
10	a	b	c	d	50	a	b	c	d	90	a	b	c	d
11	a	b	c	d	51	a	b	c	d	91	a	b	c	d
12	a	b	c	d	52	a	b	c	d	92	a	b	c	d
13	a	b	c	d	53	a	b	c	d	93	a	b	c	d
14	a	b	c	d	54	a	b	c	d	94	a	b	c	d
15	a	b	c	d	55	a	b	c	d	95	a	b	c	d
16	a	b	c	d	56	a	b	c	d	96	a	b	c	d
17	a	b	c	d	57	a	b	c	d	97	a	b	c	d
18	a	b	c	d	58	a	b	c	d	98	a	b	c	d
19	a	b	c	d	59	a	b	c	d	99	a	b	c	d
20	a	b	c	d	60	a	b	c	d	100	a	b	c	d
21	a	b	c	d	61	a	b	c	d	101	a	b	c	d
22	a	b	c	d	62	a	b	c	d	102	a	b	c	d
23	a	b	c	d	63	a	b	c	d	103	a	b	c	d
24	a	b	c	d	64	a	b	c	d	104	a	b	c	d
25	a	b	c	d	65	a	b	c	d	105	a	b	c	d
26	a	b	c	d	66	a	b	c	d	106	a	b	c	d
27	a	b	c	d	67	a	b	c	d	107	a	b	c	d
28	a	b	c	d	68	a	b	c	d	108	a	b	c	d
29	a	b	c	d	69	a	b	c	d	109	a	b	c	d
30	a	b	c	d	70	a	b	c	d	110	a	b	c	d
31	a	b	c	d	71	a	b	c	d	111	a	b	c	d
32	a	b	c	d	72	a	b	c	d	112	a	b	c	d
33	a	b	c	d	73	a	b	c	d	113	a	b	c	d
34	a	b	c	d	74	a	b	c	d	114	a	b	c	d
35	a	b	c	d	75	a	b	c	d	115	a	b	c	d
36	a	b	c	d	76	a	b	c	d	116	a	b	c	d
37	a	b	c	d	77	a	b	c	d	117	a	b	c	d
38	a	b	c	d	78	a	b	c	d	118	a	b	c	d
39	a	b	c	d	79	a	b	c	d	119	a	b	c	d
40	a	b	c	d	80	a	b	c	d	120	a	b	c	d

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4. Mail to: **GaryKlinka.com** at 1316 Cardinal Circle, Neenah, WI 54956

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Attendee's Name_____Date_____

Address_____

Credential Number_____Phone#_____

Course Title and Name_____Testconst120_____

List the name of each credential held by attendee_____

_____Credited Hours_____4 hrs_____

Email address_____Fax#_____

To be completed by GaryKlinka.com

Course Password_____Course ID#_____7932 or 13123_____

Attendee passed the course with a greater than 70% score on Date_____

Instructors Signature_____