

Roof Truss Design with Nailing Schedules

The following is reproduced from Appendix "B" of the Canadian Housing and Mortgage Corporation's publication *Canadian Wood-Frame House Construction*. This provides guidance on standard designs of "W" (fink) type trusses using plywood nailed gusset plates for use in residential construction.

1. Lumber Requirements:

Top and bottom cords and webs No.1 or No.2 and Better S-P-F

Gussets shall be 1/2in. (12.5mm) thick Douglas Fir Plywood (DFP), sheathing Grade (SHG), exterior bond type, conforming to CSA 0121. The grain of the plywood faces shall be parallel to the bottom cord except for the gussets joining the short web members to the top cord where the face grain shall be parallel to the top cord

2. Specified Snow Load:

The ground snow load for the City of Whitehorse is 1.8 KPa. The specified snow load is calculated for roofs in width over 4.3m (14') is 55% of the ground snow load plus a rain load of 0.1KPa. The specified snow load for the City of Whitehorse is 1.09 KPa, when using tables B-1 and B-2 use the next highest values of 1.44 KPa (30.1Psf).

3. Design Steps:

Determine the truss span and slope from the design drawings. (Reminder: only slopes of 4 in 12 and 3 in 12 can be used) For spans between or below values given in the tables, use the nailing schedule for the next largest span shown.

From the construction details determine if the raised or standard heel design will be used and determine if there are to be any cantilevers.

Use tables B-2 and B-3 to determine the number of nails required for each joint gusset plate. The truss joint number is shown on the respective construction detail.

Use tables B-2 and B-3 to determine the size of the cords-either 2x4, 2x6, or a combination of both. All gusset plates are fastened with 3" common steel nails.

Table B-3
Nailing Schedules for 3 in 12 (1:4) Roof Slopes

Spans 16.3 to 36.3 feet (4,980 to 11,075 mm)

Gussets: 1/2 in. (12.5 mm) DFP plywood Nailed "W" Truss

Nailing Schedule									
Top Chord Size in(mm)	Bottom Chord Size in(mm)	Specified Snow Load - S psf (kPa)	Span feet (mm)	Number of Nails at Joint Locations on Figure B-2					
				1	2	3	4	5	6
2 x 4 (38 x 89)	2 x 4 (38 x 89)	30.1 psf (1.44 kPa)	16.3 (4980)	21	21	4	7	7	14
			18.3 (5590)	24	23	4	7	7	16
			20.3 (6200)	27	26	5	8	8	17
			22.3 (6810)	29	29	5	9	9	19
			24.3 (7415)	32	31	5	10	10	21
			26.3 (8025)	35	34	6	11	11	23
2 x 6 (38 x 140)	2 x 4 (38 x 89)	30.1 psf (1.44 kPa)	16.3 (4980)	16	16	3	5	5	11
			18.3 (5590)	18	17	3	5	5	12
			20.3 (6200)	20	19	4	6	6	13
			22.3 (6810)	22	22	4	7	7	14
			24.3 (7415)	24	23	4	8	8	16
			26.3 (8025)	26	25	5	8	8	17
2 x 6 (38 x 140)	2 x 6 (38 x 140)	30.1 psf (1.44 kPa)	30.3 (9245)	30	29	6	7	9	20
			32.3 (9855)	32	31	6	7	10	21
			34.3 (10 465)	34	33	7	8	11	22
			36.3 (11 075)	36	35	8	9	12	23

Truss and gusset plate detailing nailed "W" truss

Roof slope 3 in 12 (1:4)

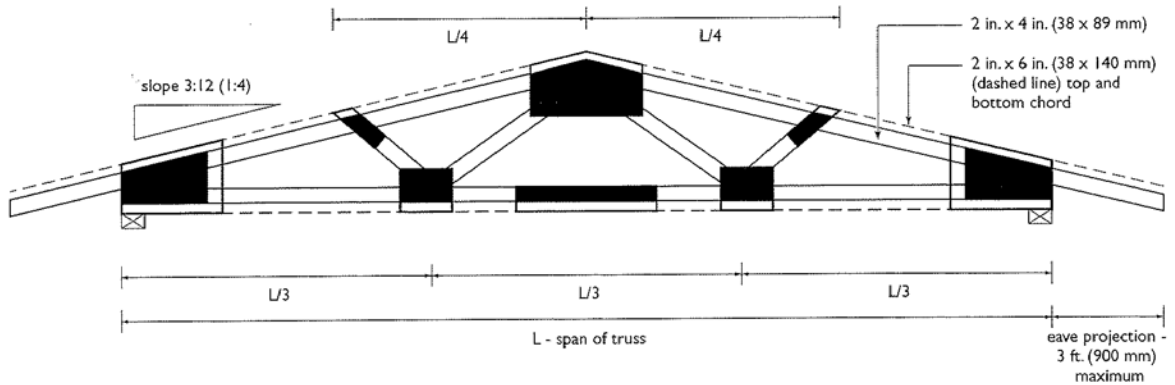
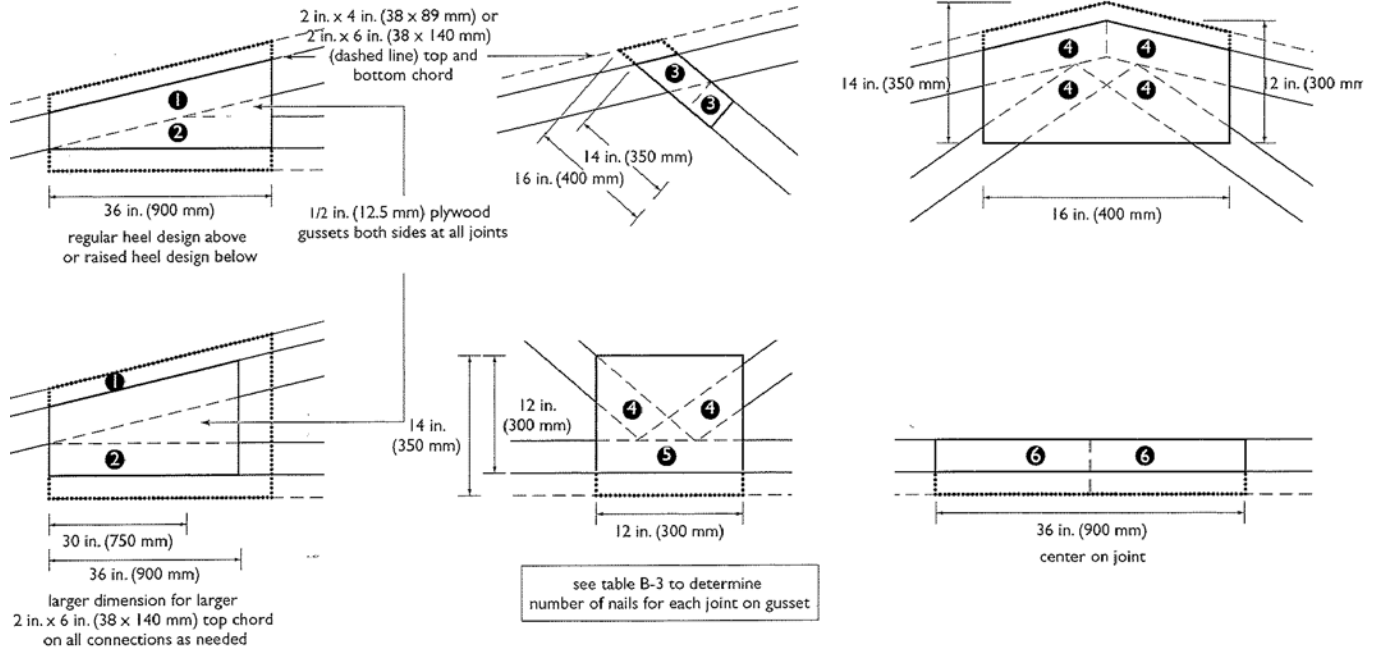


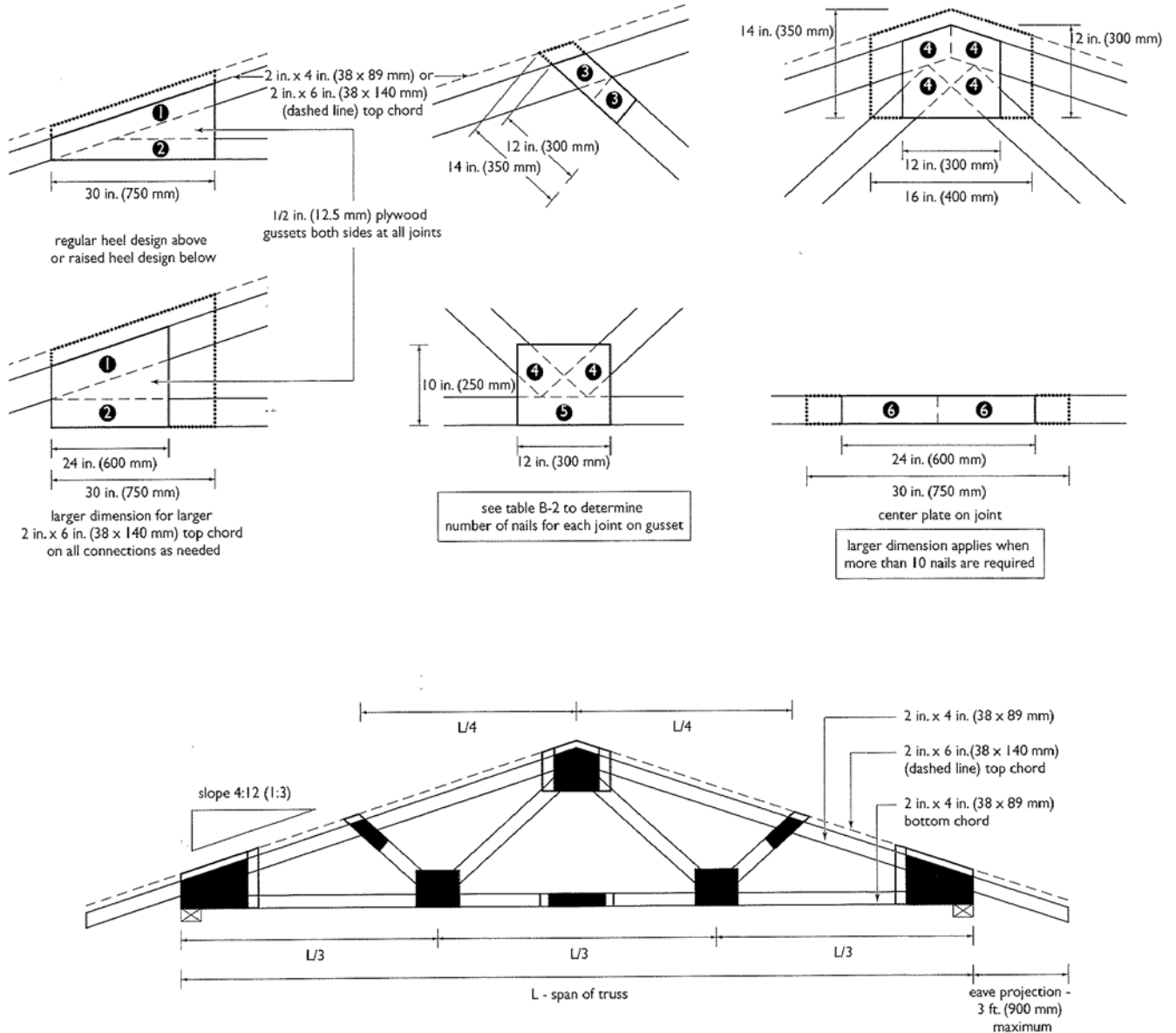
Table B-2
Nailing Schedules for 4 in 12 (1:3) Roof Slopes

Spans 16.3 to 36.3 feet (4,980 to 11,075 mm)

Gussets: 1/2 in. (12.5 mm) DFP plywood Nailed "W" Truss

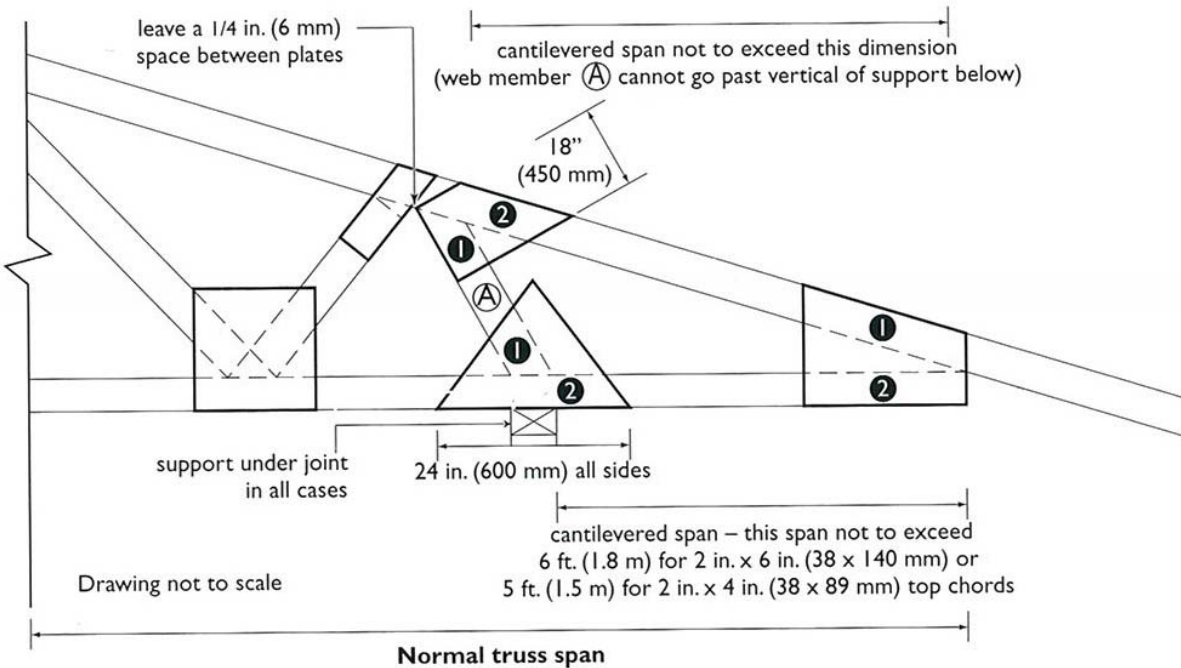
Top Chord Size	Nailing Schedule		Span	Number of Nails at Joint Locations on Figure B-1					
	Bottom Chord Size	Specified Snow Load - S		1	2	3	4	5	6
in (mm)	(in) mm	psf (kPa)	feet (mm)						
2 x 4 (38 x 89)	2 x 4 (38 x 89)	30.1 psf (1.44 kPa)	16.3 (4980)	12	11	2	4	4	7
			18.3 (5590)	13	12	3	4	5	8
			20.3 (6200)	15	13	3	4	5	9
			22.3 (6810)	16	14	3	5	6	10
			24.3 (7415)	17	16	4	5	6	11
			26.3 (8025)	19	17	4	6	7	11
			28.3 (8635)	20	18	4	6	7	12
2 x 6 (38 x 140)	2 x 4 (38 x 89)	30.1 psf (1.44 kPa)	30 (9145)	18	17	4	5	6	12

Truss and gusset plate detailing nailed "W" truss Roof slope 4 in 12 (1:3)



Cantilever detail nailed "W" truss with plywood gussets

The following design allows for the use of an additional web member (A) to relocate the bearing point away from the heel joint to create a cantilever



Notes

1. Top and bottom chord sizes and nailing requirements are determined from tables B-2 and B-3.
2. The additional web member (A) shall be the same size as the top chord.
3. If desired, both ends of the truss can be cantilevered using the above construction technique.
4. The nailing for the new gusset plates as per above to match heel joint. The size of gusset plates can be adjusted for member (A) if space is restricted.

Method for fabricating joints

