



# Snow Load Report

## 1. Roof and Building Data

Ground Snow Load (Pg):	25.0 psf
Roof Pitch:	7 /12
Risk Category:	II
Eave-to-Ridge (W):	13 ft.
Terrain Category:	B
Exposure:	Partially Exposed
Thermal Factor (C <sub>t</sub> ):	1.00
Roof Surface:	Asphalt Shingles
Roof System:	Rafter
Spacing:	24 in. o/c
Overhang:	8 in.

## 2. Design Loads

Top Chord Dead Load:	10 psf
Bottom Chord Dead Load:	5 psf
SF (Slope Factor) = 1/Cosine(Φ) = 1.16	(Dead loads specified on a projected horizontal basis take into account the effect of the pitch via a slope factor.)
Adj. TCDL (TCDL x SF):	11.6 psf

## 3. Design Assumptions

Code Standard:	ASCE 7-10
Number of Plies:	1 PLY
Bottom Chord Pitch:	0 /12

## 4. Snow Load Calculations

Calculate flat roof snow load  $p_f$  using the following equation:

$$p_f = 0.7C_eC_tI_s p_g$$

where:

- $p_f$  = Flat Roof Snow Load in psf
- $C_e = 1.00$  = Exposure Factor, as determined by ASCE 7-10 Table 7-2 (Terrain Cat. B, Exp. Partially Exposed)
- $C_t = 1.00$  = Thermal Factor, as determined by ASCE 7-10 Table 7-3
- $I_s = 1.00$  = Importance Factor, as determined by ASCE 7-10 Table 1.5-2 (Risk Cat. II)
- $p_g = 25.0$  psf = Ground Snow Load in psf

$$p_f = 0.7C_eC_tI_s p_g = 0.7(1.00)(1.00)(1.00)(25.0) = 17.5 \text{ psf}$$

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A minimum roof snow load,  $p_m$  shall apply to monoslope, hip and gable roofs with slopes less than 15 degrees using the following equations:

Where  $p_g$  is 20 psf or less:  $p_m = I_s p_g$

Where  $p_g$  exceeds 20 psf:  $p_m = I_s (20)$

**Roof slope is greater than 15 degrees, the minimum roof snow load,  $p_m$ , does not apply.**

For locations where  $p_g$  is 20 psf or less, but not zero, all roofs with slopes (in degrees) less than  $W/50$  with  $W$  in feet shall included a 5 psf rain-on-snow surcharge load. This additional load applies only to the sloped roof (balanced) load case and need not be used in combination with drift, sliding, unbalanced, minimum, or partial loads.

**Roof slope in degrees ( $30.26^\circ$ ) is greater than  $W/50 = 0.3$ , the 5.0 psf rain-on-snow surcharge load does not apply.**

Calculate sloped roof snow load  $p_s$  using the following equation:

$$p_s = C_s p_f$$

where:

$p_s$  = Sloped Roof Snow Load in psf

$C_s = 1 - [(30.26 - 30) / 40] = 0.99$  = Roof Slope Factor, as determined by ASCE 7-10 Sec. 7.4.1-7.4.4 and Figure 7-2

$p_f$  = Flat Roof Snow Load in psf

**Roof surface (Asphalt Shingles) is considered a "non-slippery" roof. For a  $C_t = 1.00$  the roof slope factor  $C_s$  is given by the solid line of ASCE 7-10 Figure 7-2a.**

$$p_s = C_s p_f = (0.99)(17.5) = 17.4 \text{ psf}$$

Calculate unbalanced snow load for hip and gable roofs as shown in ASCE 7-10 Figure 7-5.

Unbalanced snow loads are required for roof pitches between 1/2 on 12 to 7 on 12.

Using the following equations:

$$\gamma = 0.13 p_g + 14 \text{ (snow density)}$$

$$h_d = .43 \sqrt[3]{l_u^4 p_g} + 10 - 1.5 \text{ (drift height) [if } l_u < 20 \text{ ft., use } l_u = 20 \text{ ft.]}$$

$$l_d = \frac{8}{3} h_d \sqrt{S} \text{ (width of drift surcharge)}$$

$$p_d = h_d \gamma / \sqrt{S} \text{ (drift surcharge snow load)}$$

where:

$\gamma$  = Snow density in pcf, not to exceed 30 pcf.

$h_d$  = Drift height in feet, as determined by eqn. or ASCE 7-10 Fig. 7-9.

$l_u = W$  = Ridge to eave distance in feet, windward side of roof.

$S = 12/\text{Roof Pitch}$

$l_d$  = Width of drift surcharge in feet.

$p_d$  = Drift Surcharge Snow Load in psf



FIGURE 7-5 Balanced and Unbalanced Snow Loads for Hip and Gable Roofs.

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For a roof rafter system with  $W \leq 20$  ft., the simplified unbalanced snow load is given by the third diagram of ASCE Figure 7-5.

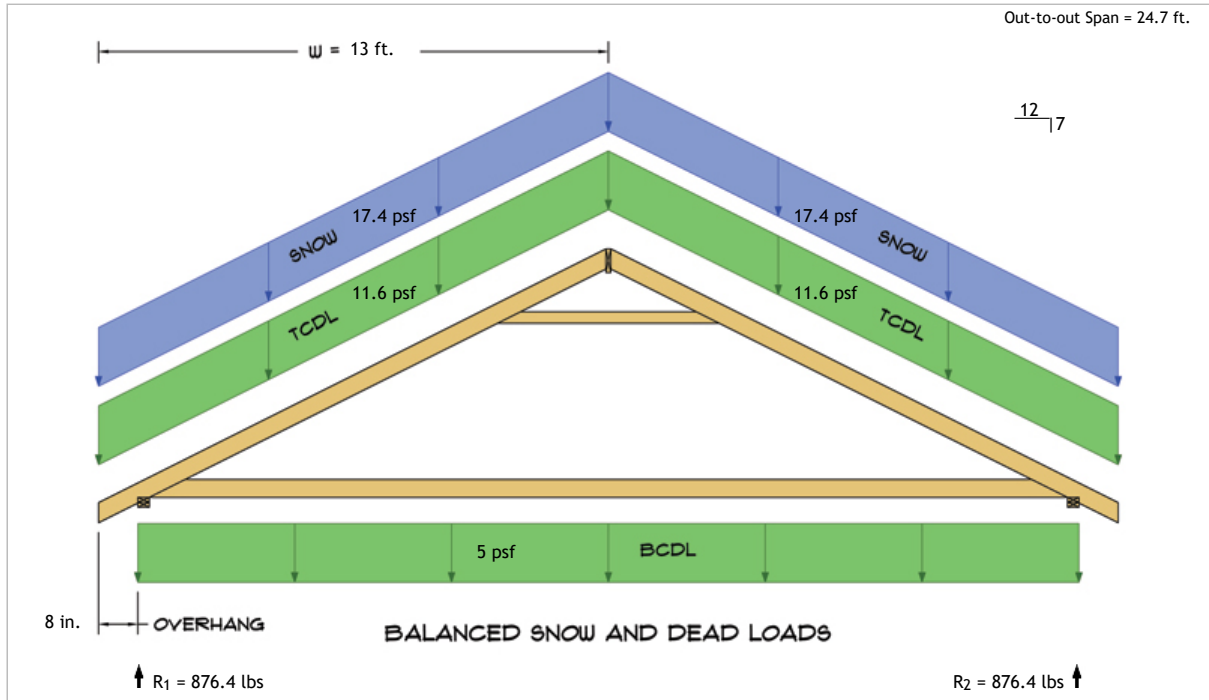
$$p_{\text{windward}} = 0.0 \text{ psf}$$

$$p_{\text{leeward}} = I_s p_g = (1.00)(25.0) = 25.0 \text{ psf}$$

On warm roofs apply a distributed  $2p_f$  snow load on all overhanging portions as per ASCE 7-10 section 7.4.5.

No other loads except dead loads shall be present on the roof when this uniformly distributed load is applied.

$$2p_f = (2)(17.5) = 35.0 \text{ psf}$$



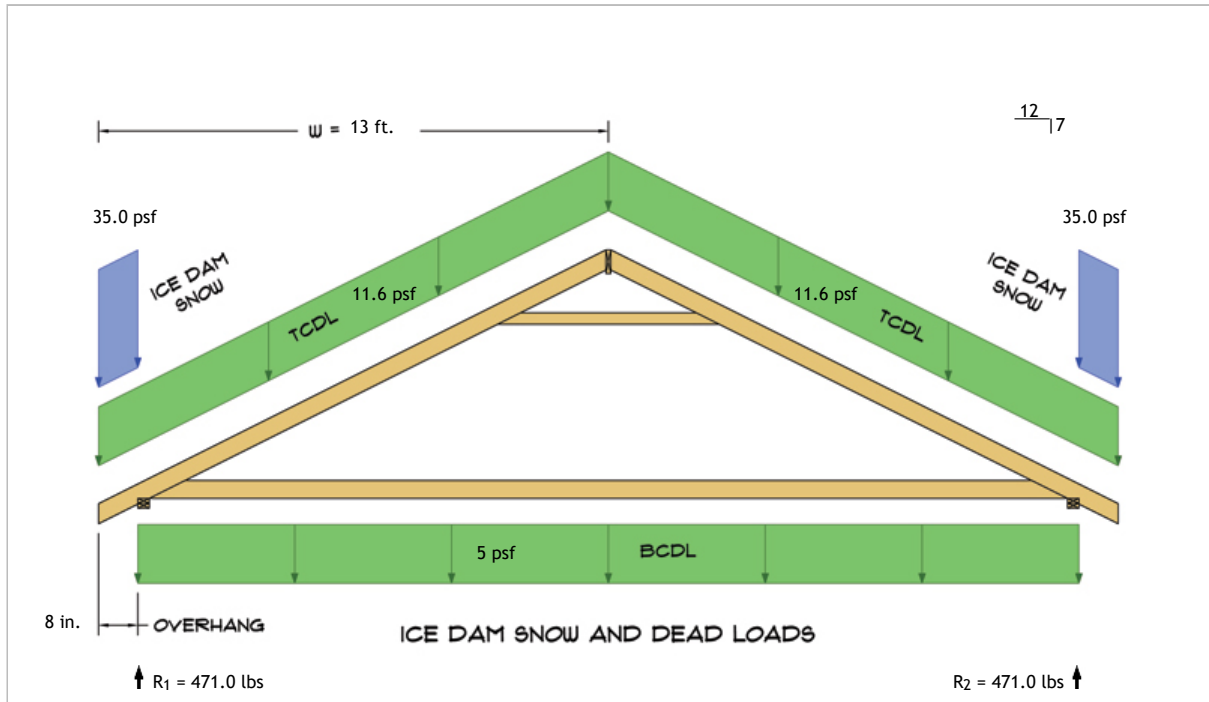
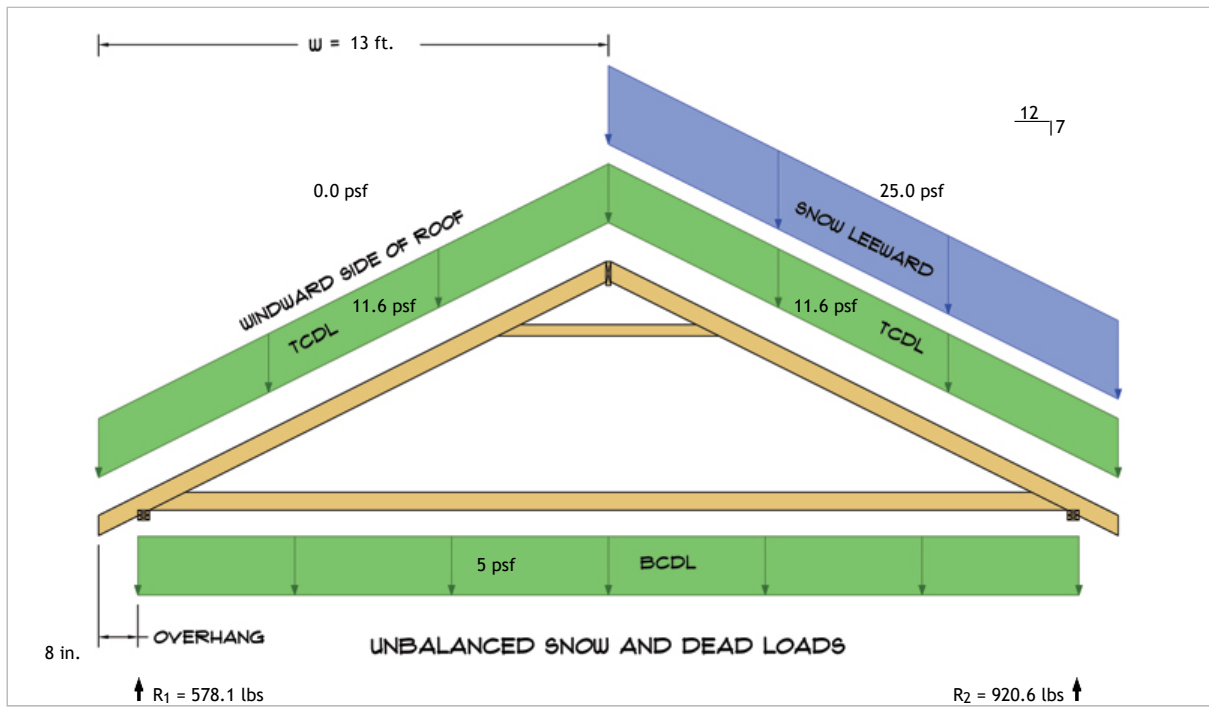
$$R_1 = D + S = 424.3 \text{ lbs} + 452.0 \text{ lbs}$$

$$R_2 = D + S = 424.3 \text{ lbs} + 452.0 \text{ lbs}$$

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