Snow Load Report

1. Roof and Building Data

Ground Snow Load (Pg):	86.0 psf
Roof Pitch:	2 /12
Risk Category:	II
Eave-to-Ridge (W):	20.5 ft.
Terrain Category:	B
Exposure:	Partially Exposed
Thermal Factor (C_t):	1.10
Roof Surface:	Asphalt Shingles
Roof System:	Rafter
Spacing:	24 in. o/c
Overhang:	12 in.

2. Design Loads

Top Chord Dead Load:	10	psf
Bottom Chord Dead Load:	0	psf

SF (Slope Factor) = 1/Cosine(Φ) = 1.01 (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): 10.1 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:

$$p_f = 0.7C_eC_tI_sp_g$$

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 = 1.10 = 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 = 86.0 psf = Ground Snow Load in psf

$p_f = 0.7C_eC_tI_sp_g = 0.7(1.00)(1.10)(1.00)(86.0) = 66.2$ psf

Subject: Snow Loads	Customer: Winterlong Design Intervale NH	Location:	Job No.: 2620
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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: $p_m = I_s(20)$

Minimum roof snow load of $p_m = I_s(20) = 1.00 \times 20 = 20.0$ psf and hence does not control.

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 (9.46°) is greater than W/50 = 0.4, 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 = 1.00 = 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 = 1.10 the roof slope factor C_s is given by the solid line of ASCE 7-10 Figure 7-2b.

$p_s = C_s p_f = (1.00)(66.2) = 66.2$ 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:

$\gamma = 0.13 p_g + 14$ (snow density)
$h_d = .43\sqrt[3]{l_u}\sqrt[4]{p_g + 10} - 1.5$ (drift height) [if $l_u < 20$ ft., use $l_u = 20$ ft.]
$l_d = \frac{8}{3} h_d \sqrt{S}$ (width of drift surcharge)
$p_d = h_d \gamma / \sqrt{S}$ (drift surcharge snow load)

where:

γ = 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/Roof Pitch
l_d = Width of drift surcharge in feet.
p_d = Drift Surcharge Snow Load in psf

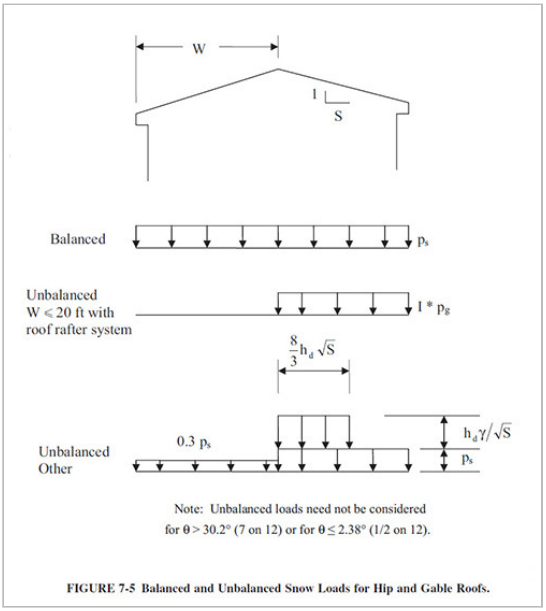

FIGURE 7-5 Balanced and Unbalanced Snow Loads for Hip and Gable Roofs.

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$p_{windward} = 0.3p_s = (0.3)(66.2) = 19.9$ psf
$p_{leeward} = p_s = 66.2$ psf

$\gamma = 0.13(86.0) + 14 = 25.18$ pcf

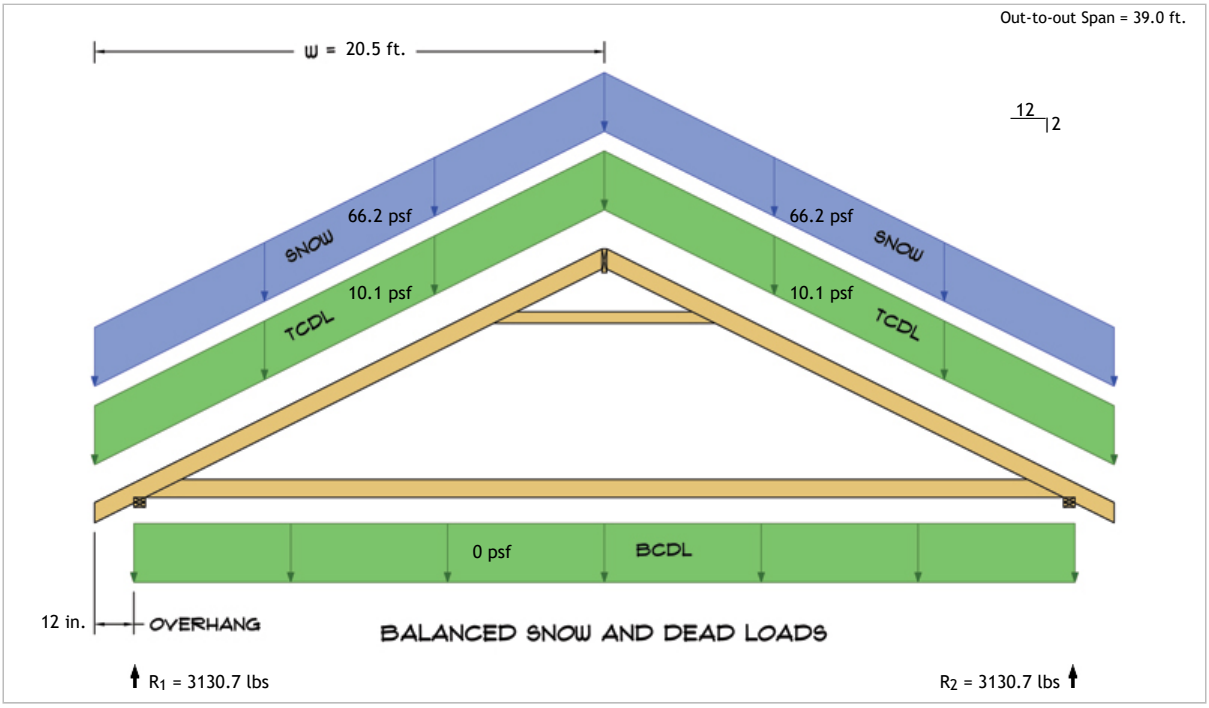
$h_d = .43\sqrt[3]{20.5}\sqrt[4]{86.0 + 10} - 1.5 = 2.18$ ft. [$l_u = 20.5$ ft.]

$$l_d = \frac{8}{3} \times 2.18 \times \sqrt{12/2} = 14.26 \text{ ft.}$$

$$p_d = \frac{2.18 \times 25.18}{\sqrt{12/2}} = 22.4 \text{ psf}$$

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.

$2p_f = (2)(66.2) = 132.4$ psf



$R_1 = D + S = 415.7$ lbs + 2715.0 lbs
$R_2 = D + S = 415.7$ lbs + 2715.0 lbs

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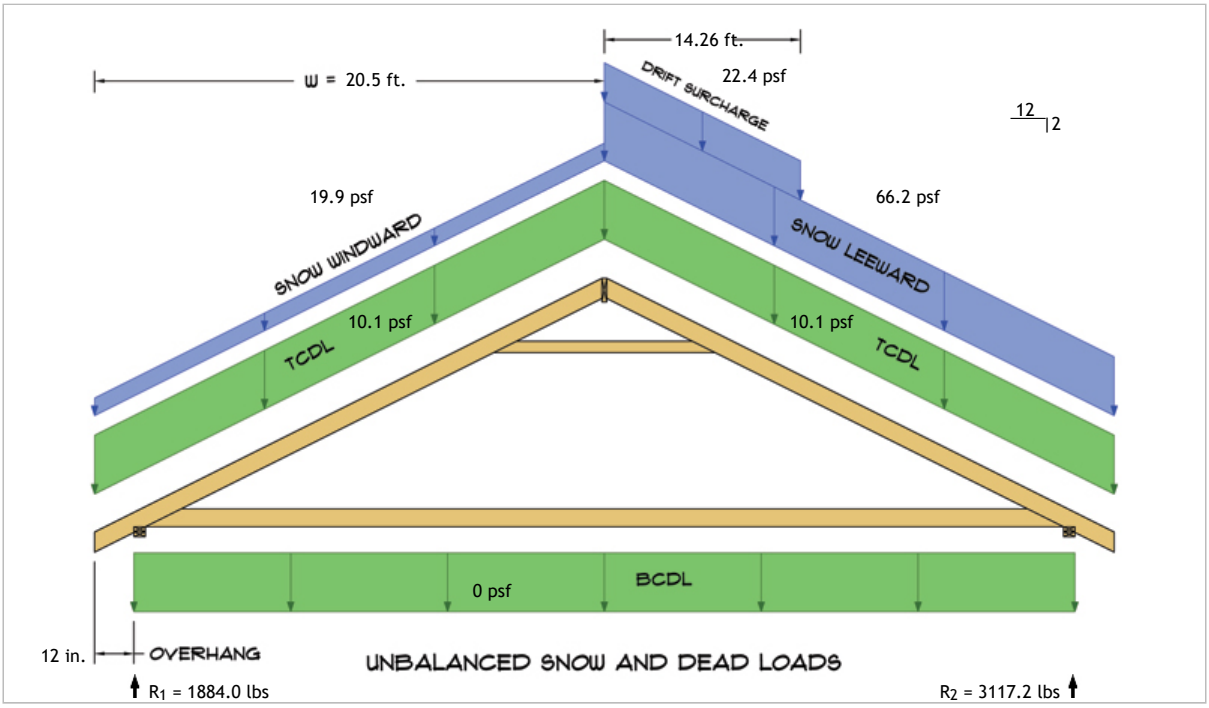
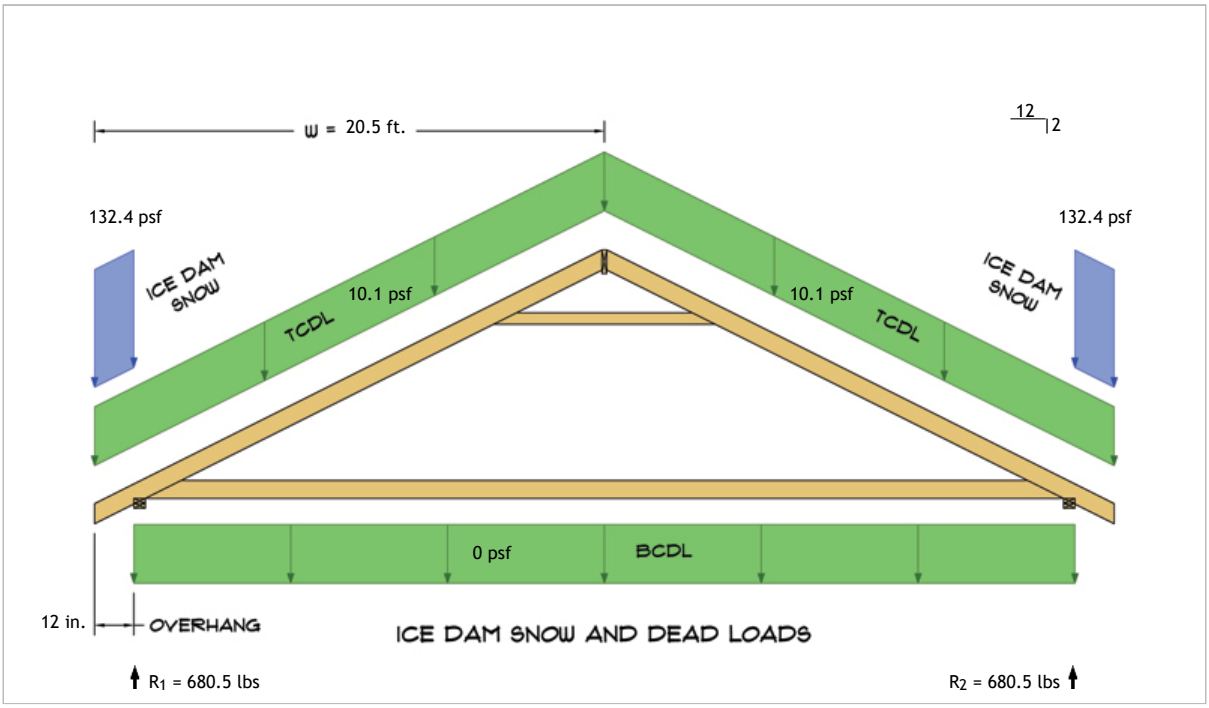


R_1 = D + S = 415.7 lbs + 1468.4 lbs
R_2 = D + S = 415.7 lbs + 2701.6 lbs



R_1 = D + S = 415.7 lbs + 264.9 lbs
R_2 = D + S = 415.7 lbs + 264.9 lbs

*Disclaimer: The calculations produced herein are for initial design and estimating purposes only. The calculations and drawings presented do not constitute a fully engineered design. All of the load cases required to fully design an actual structure are not provided by this calculator. For the design of an actual structure, a registered and licensed professional should be consulted as per IRC 2012 Sec. R802.10.2 and designed according to the minimum requirements of ASCE 7-10. The snow load calculations provided by this online tool are for educational and illustrative purposes only. Medeek Design assumes no liability or loss for any designs presented and does not guarantee fitness for use.

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