# Snow Load Report

## 1. Roof and Building Data

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|---|---|
| Ground Snow Load (Pg): | 40.0 psf |
| Roof Pitch: | 1 /12 |
| Risk Category: | I |
| Eave-to-Ridge (W): | 82 ft. |
| Terrain Category: | C |
| Exposure: | Partially Exposed |
| Thermal Factor ($C_t$): | 1.20 |
| Roof Surface: | Metal |
| Roof System: | Rafter |
| Spacing: | 192 in. o/c |
| Overhang: | 60 in. |

## 2. Design Loads

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|---|---|
| Top Chord Dead Load: | 10 psf |
| Bottom Chord Dead Load: | 5 psf |

SF (Slope Factor) = 1/Cosine(Φ) = 1.00 (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): 10.0 psf

## 3. Design Assumptions

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|---|---|
| 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. C, Exp. Partially Exposed)
$C_t$ = 1.20 = Thermal Factor, as determined by ASCE 7-10 Table 7-3
$I_s$ = 0.80 = Importance Factor, as determined by ASCE 7-10 Table 1.5-2 (Risk Cat. I)
$p_g$ = 40.0 psf = Ground Snow Load in psf

$$p_f = 0.7C_eC_tI_sp_g = 0.7(1.00)(1.20)(0.80)(40.0) = 26.9 \text{ psf}$$

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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: $p_m = I_s(20)$

Minimum roof snow load of $p_m = I_s(20) = 0.80 \times 20 = 16.0$ 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 (4.76°) is greater than W/50 = 1.6, 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 (Metal) is considered a "slippery" roof. For a $C_t = 1.20$ the roof slope factor $C_s$ is given by the dashed line of ASCE 7-10 Figure 7-2c.

$p_s = C_s p_f = (1.00)(26.9) = 26.9$ 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:

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

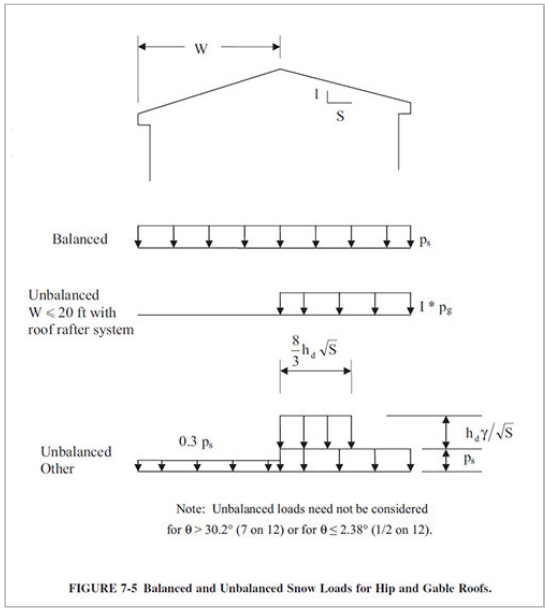


FIGURE 7-5 Balanced and Unbalanced Snow Loads for Hip and Gable Roofs.

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$p_{windward} = 0.3p_s = (0.3)(26.9) = 8.1$ psf
$p_{leeward} = p_s = 26.9$ psf

$\gamma = 0.13(40.0) + 14 = 19.20$ pcf

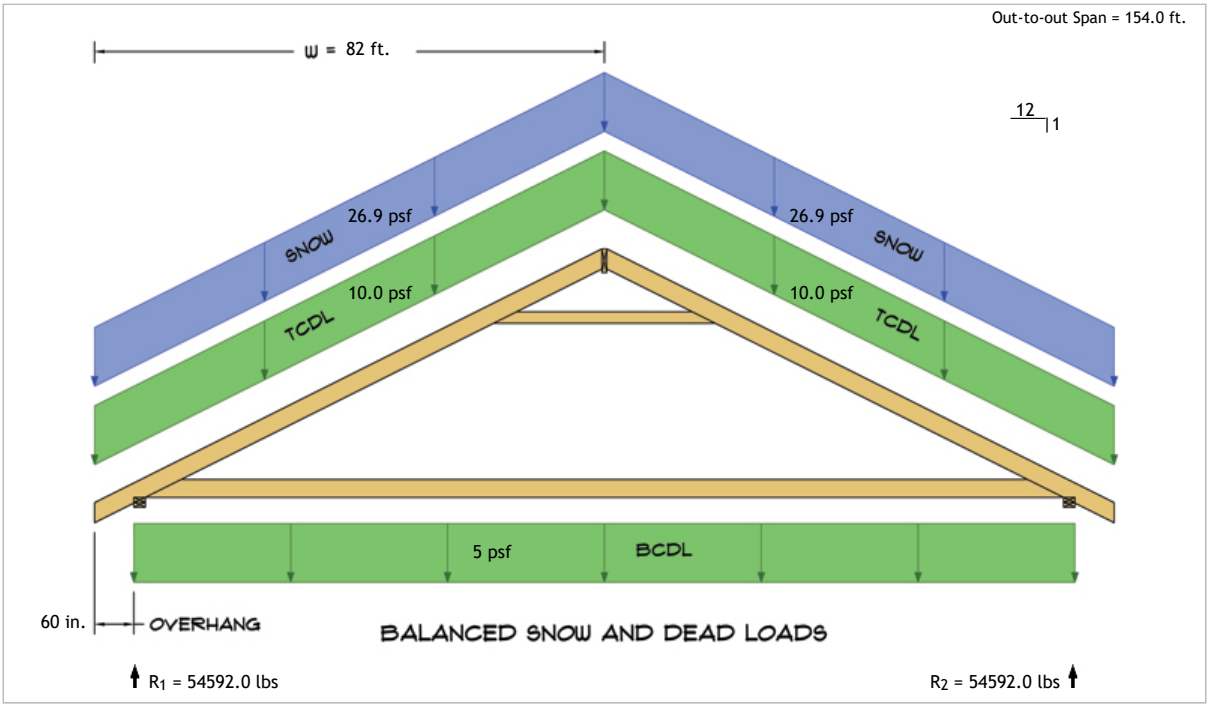
$h_d = .43\sqrt[3]{82}\sqrt[4]{40.0 + 10} - 1.5 = 3.47$ ft. [$l_u = 82$ ft.]

$l_d = \frac{8}{3} \times 3.47 \times \sqrt{12/1} = 32.03$ ft.

$p_d = \frac{3.47 \times 19.20}{\sqrt{12/1}} = 19.2$ 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.

$2p_f = (2)(26.9) = 53.8$ psf




$R_1 = D + S = 19325.5$ lbs + 35266.6 lbs
$R_2 = D + S = 19325.5$ lbs + 35266.6 lbs

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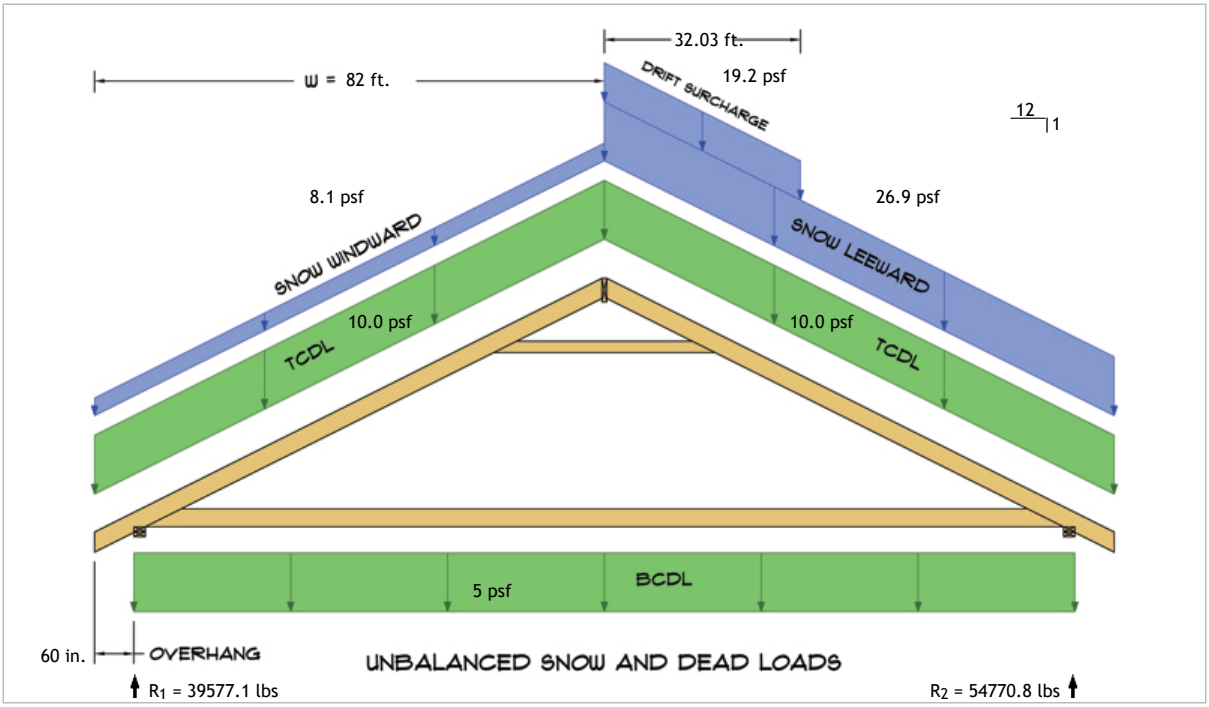
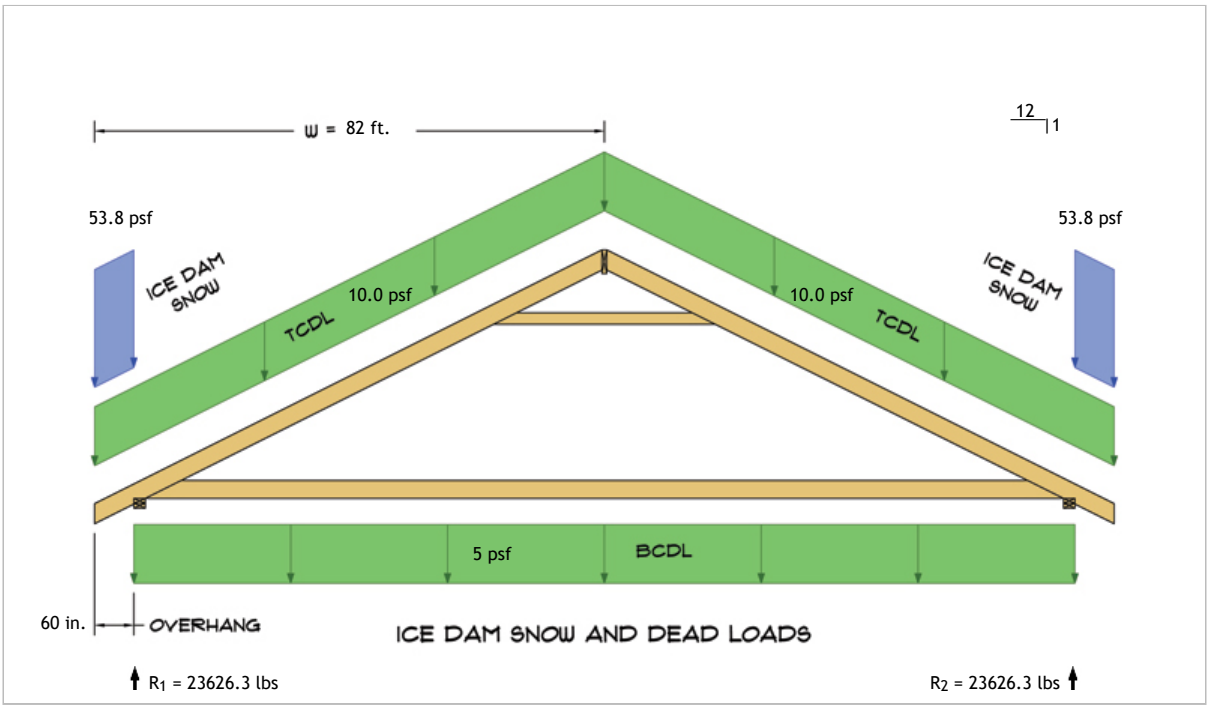



$R_1$ = D + S = 19325.5 lbs + 20251.6 lbs
$R_2$ = D + S = 19325.5 lbs + 35445.3 lbs




$R_1$ = D + S = 19325.5 lbs + 4300.8 lbs
$R_2$ = D + S = 19325.5 lbs + 4300.8 lbs

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