



Snow Load Report

1. Roof and Building Data

Ground Snow Load (Pg):	36.0 psf	Exposure:	Sheltered
Roof Pitch:	4 /12	Thermal Factor (Ct):	1.10
Risk Category:	II	Roof Surface:	Metal
Eave-to-Ridge (W):	20 ft.	Roof System:	Attic Truss
Attic Width (A):	12 ft.	Spacing:	24 in. o/c
Terrain Category:	C	Overhang:	12 in.

2. Design Loads

Top Chord Dead Load:	7 psf
Bottom Chord Dead Load:	10 psf
Ceiling Dead Load:	5 psf
Floor Dead Load:	10 psf
Floor Live Load:	40 psf
SF (Slope Factor) = 1/Cosine(Φ) = 1.05 (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):	7.4 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
- $C_e = 1.10$ = Exposure Factor, as determined by ASCE 7-10 Table 7-2 (Terrain Cat. C, Exp. Sheltered)
- $C_t = 1.10$ = 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)
- $p_g = 36.0$ psf = Ground Snow Load in psf

$$p_f = 0.7C_eC_tI_s p_g = 0.7(1.10)(1.10)(1.00)(36.0) = 30.5 \text{ psf}$$

Subject Snow Loads	Customer	Location	Job No. 2025A65
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Date 2/23/2025			
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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 (18.43°) 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

$C_s = 1 - [(18.43 - 10)/60] = 0.86$ = 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 $C_t = 1.10$ the roof slope factor C_s is given by the dashed line of ASCE 7-10 Figure 7-2b.

$$p_s = C_s p_f = (0.86)(30.5) = 26.2 \text{ psf}$$

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:

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.

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

l_d = Width of drift surcharge in feet.

p_d = Drift Surcharge Snow Load in psf



Subject Snow Loads	Customer	Location	Job No. 2025A65
Engr. Engr. Name	STRUCTURAL ENGINEERING INC. Street Address City, ST 99999 ph. (800) 000-0000 www.website.com		Rev. -
Date 2/23/2025			Page 2



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$$p_{\text{windward}} = 0.3p_s = (0.3)(26.2) = 7.9 \text{ psf}$$

$$p_{\text{leeward}} = p_s = 26.2 \text{ psf}$$

$$\gamma = 0.13(36.0) + 14 = 18.68 \text{ pcf}$$

$$h_d = .43 \sqrt[3]{20} \sqrt[4]{36.0 + 10} - 1.5 = 1.54 \text{ ft. } [l_u = 20 \text{ ft.}]$$

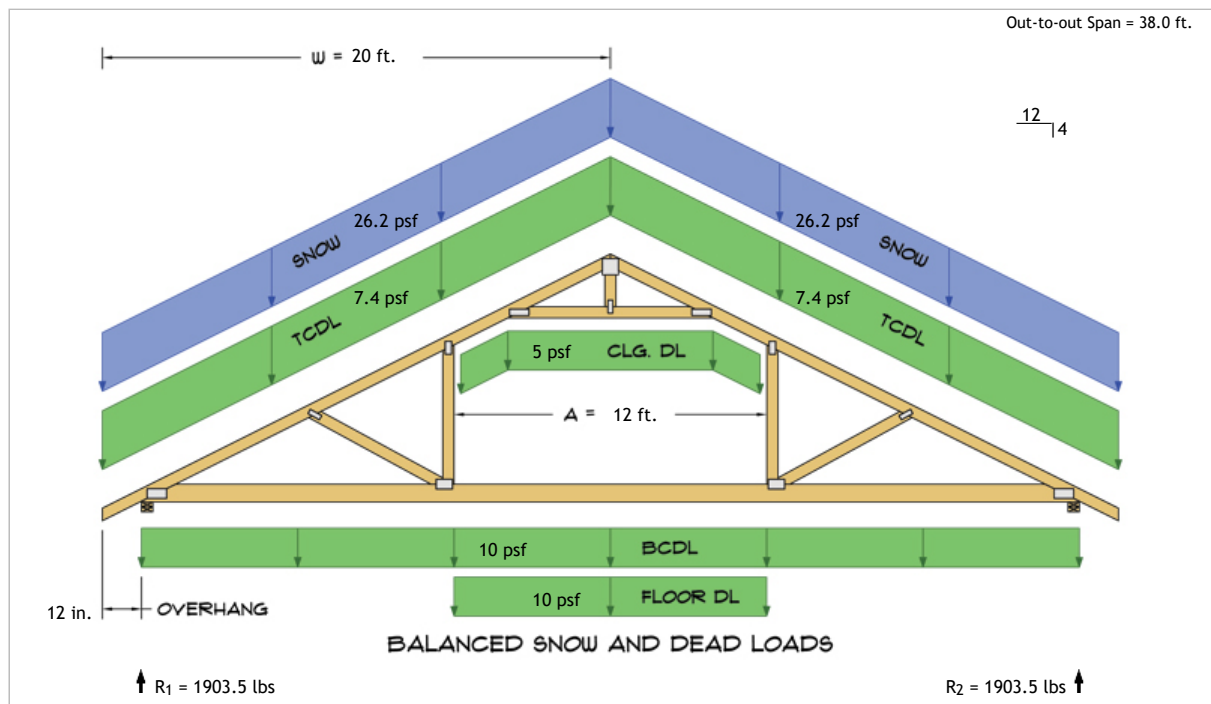
$$l_d = \frac{8}{3} \times 1.54 \times \sqrt{12/4} = 7.11 \text{ ft.}$$

$$p_d = \frac{1.54 \times 18.68}{\sqrt{12/4}} = 16.6 \text{ psf}$$

On warm roofs apply a distributed 2pf 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.

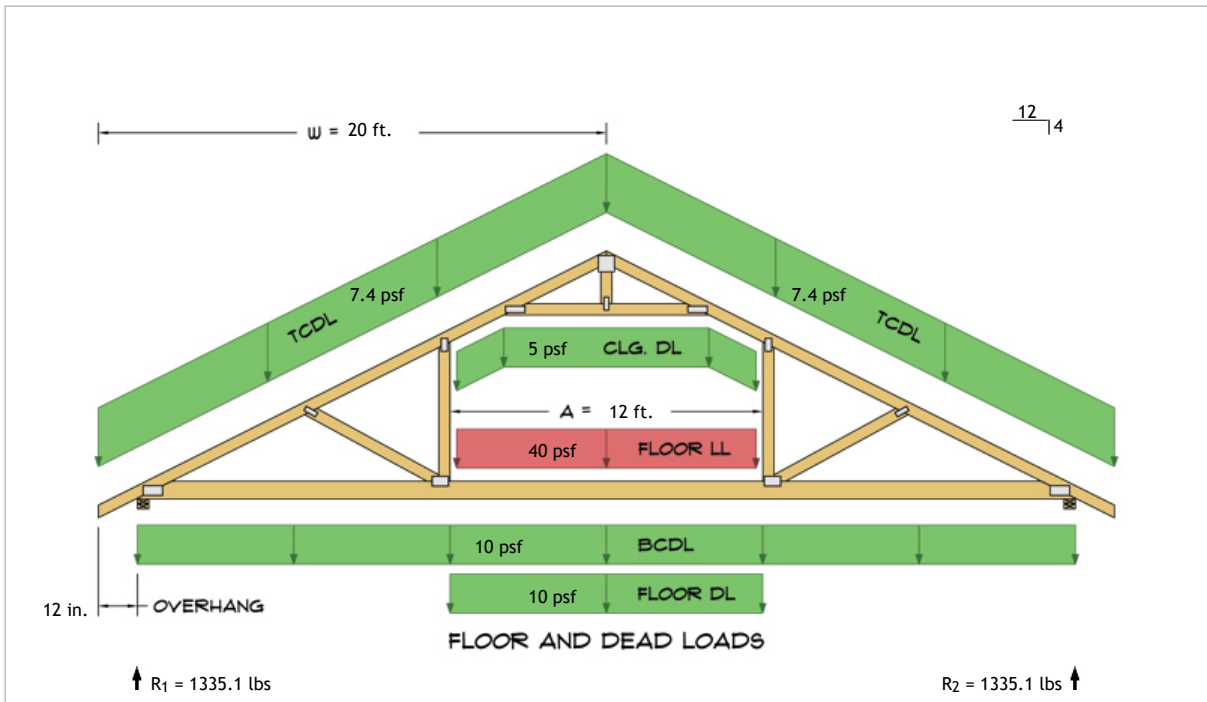
$$2p_f = (2)(30.5) = 61.0 \text{ psf}$$



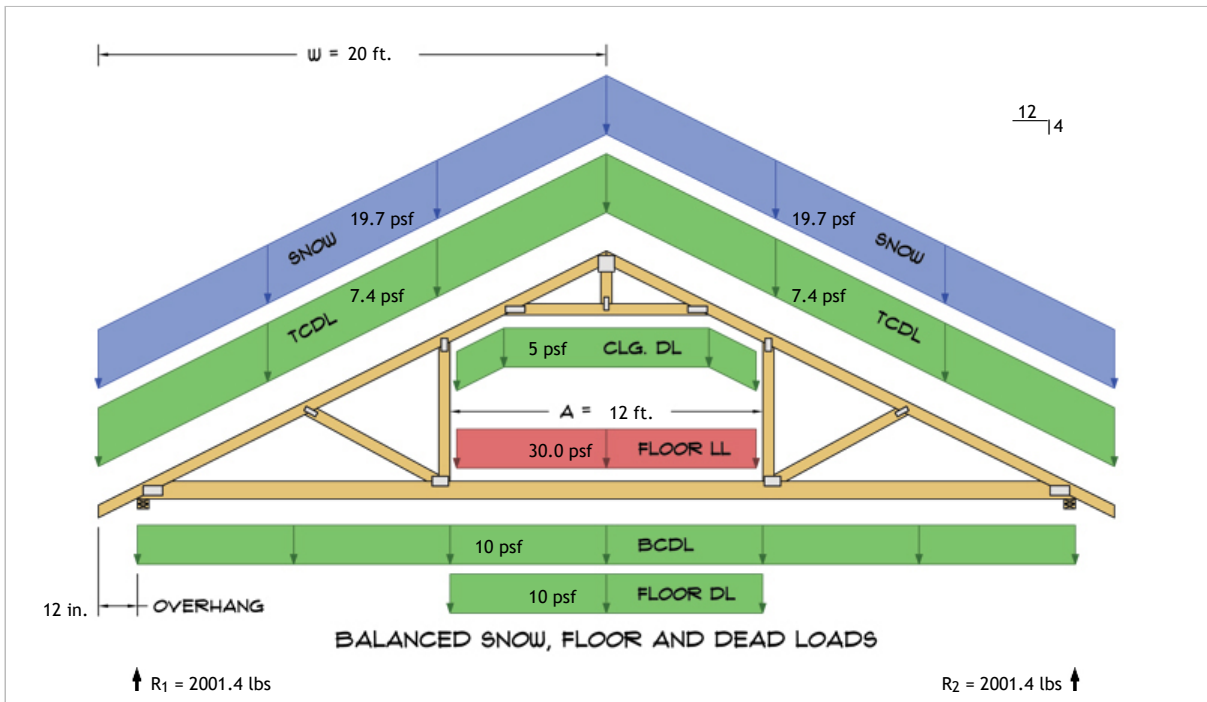
$$R_1 = D + S = 855.1 \text{ lbs} + 1048.3 \text{ lbs}$$

$$R_2 = D + S = 855.1 \text{ lbs} + 1048.3 \text{ lbs}$$


Subject	Snow Loads	Customer	Location	Job No.	2025A65	
Engr.	Engr. Name	STRUCTURAL ENGINEERING INC. Street Address City, ST 99999 ph. (800) 000-0000 www.website.com			Rev.	-
Date	2/23/2025				 This report may not be copied, reproduced or distributed without the written consent of Engineering Company Inc. Copyright © 2025	Page

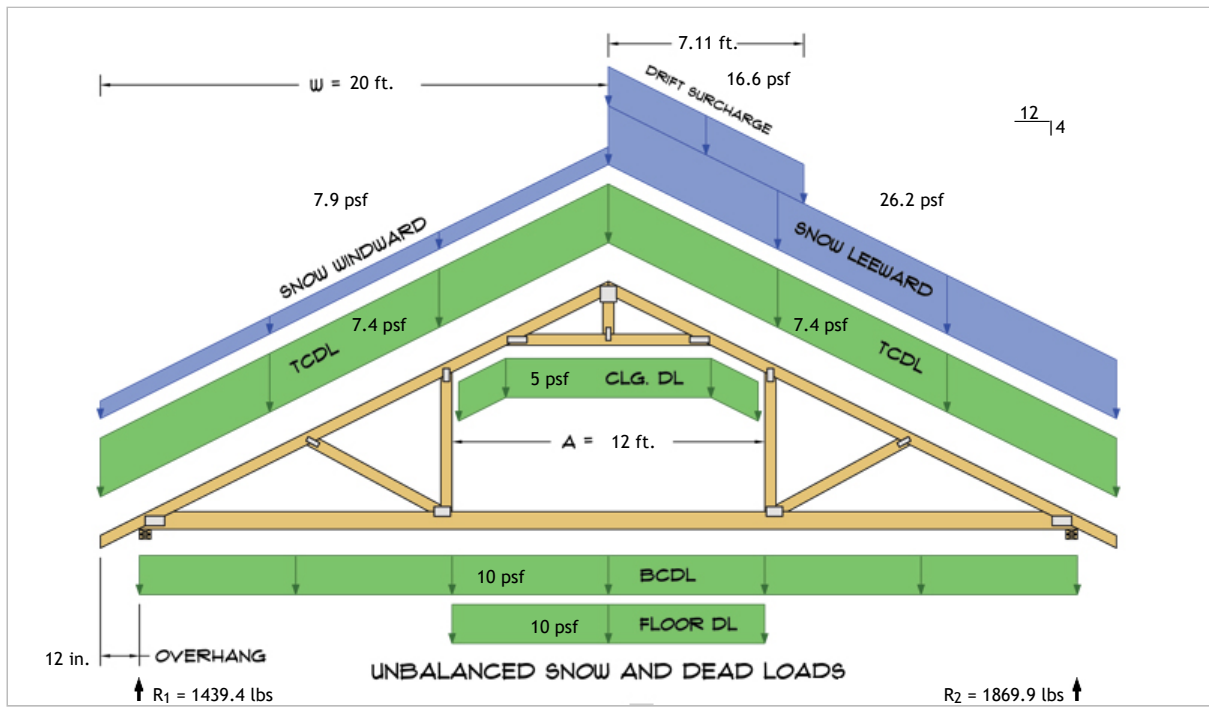


$R_1 = D + L = 855.1 \text{ lbs} + 480.0 \text{ lbs}$
 $R_2 = D + L = 855.1 \text{ lbs} + 480.0 \text{ lbs}$

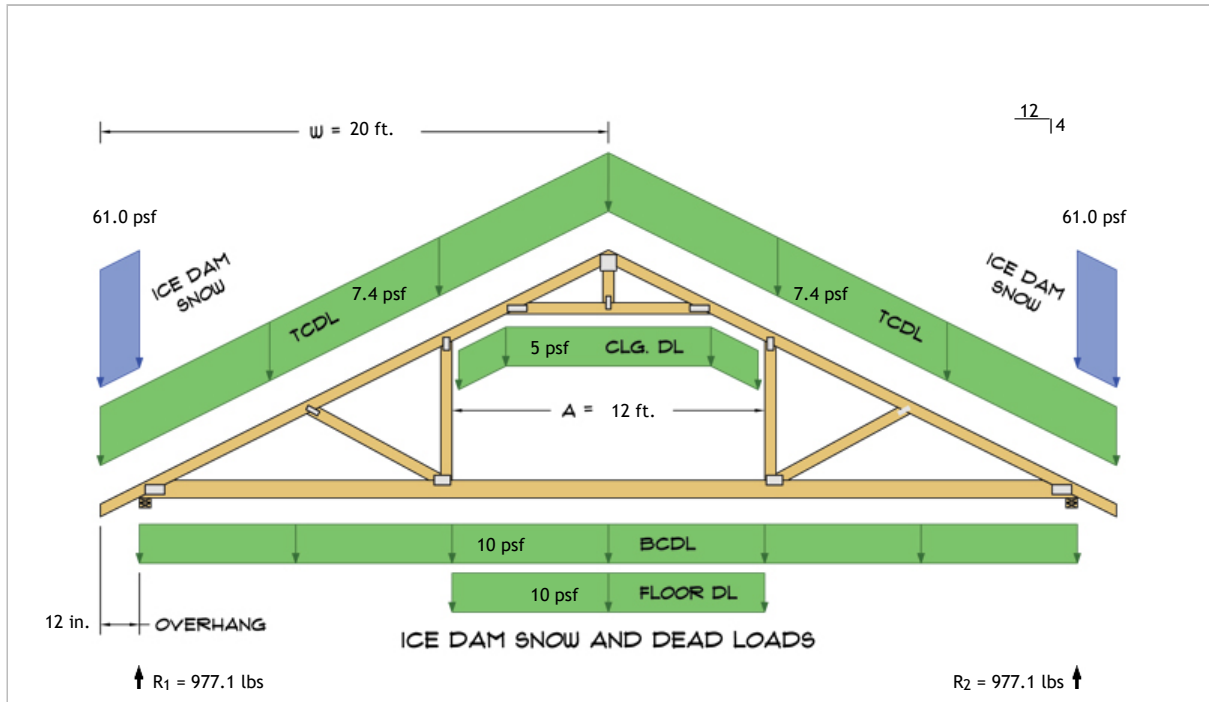


$R_1 = D + 0.75L + 0.75S = 855.1 \text{ lbs} + 360.0 \text{ lbs} + 786.2 \text{ lbs}$
 $R_2 = D + 0.75L + 0.75S = 855.1 \text{ lbs} + 360.0 \text{ lbs} + 786.2 \text{ lbs}$

Subject	Customer	Location	Job No.
Snow Loads			2025A65
Engr.	Engr. Name		Rev.
Date	2/23/2025		-
STRUCTURAL ENGINEERING INC. Street Address City, ST 99999 ph. (800) 000-0000 www.website.com			Page
			4
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$R_1 = D + S = 855.1 \text{ lbs} + 584.3 \text{ lbs}$
 $R_2 = D + S = 855.1 \text{ lbs} + 1014.7 \text{ lbs}$



$R_1 = D + S = 855.1 \text{ lbs} + 122.0 \text{ lbs}$
 $R_2 = D + S = 855.1 \text{ lbs} + 122.0 \text{ lbs}$

*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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Date	2/23/2025			Page	5



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