Roof Snow Load Determination

using ASCE 7-10, Ch. 7

d/b/a Structures Consulting

Project Information

Project:	Test		
Description:	Double gable roof		
Date:	9-Jan-2012	Address:	
Client:	Eng-Tips Forum	Location:	
Client customer:	n/a		

Gable Roof - Basic Dimensions

Length of Ridge ►	100	feet
Width, **W**, eave to ridge ►	50.00	feet
Roof slope ►	5.00	in. rise in 12 inches
or	22.6	degrees
or **S** =	2.40	unit(s) run per one unit rise

Determine Flat Roof Snow Load

Ground snow load, p_g ►		**20**	**PSF** - from ASCE 7-10, Figure 7-1
Terrain category ►	C		(Select 'E' for above treeline, 'F' for Alaska.) - from Table 7-2
Exposure of roof ►	Sheltered		See footnotes for Table 7-2.
Exposure Factor, C_e =		1.10	- From 7.3.1
Thermal Factor, C_t ►		1.20	Unheated & open air structures - From 7.3.2
Risk Category ►	I		from Table 1.5-1
Snow Importance Factor, I_s =		0.80	from Table 1.5-2
Flat Roof Snow Load, p_f =		**14.8**	**PSF** - from Equation 7.3-1 - $p_f = 0.7C_eC_tI_sp_g$

Determine Sloped Roof Snow Load

Roof slope factor, C_s ►	1.00	From Section 7.4 and Figure 7-2
Sloped Roof Snow Load =	**14.8**	**PSF** - from Equation 7.4-1 - $p_s = C_sp_f$

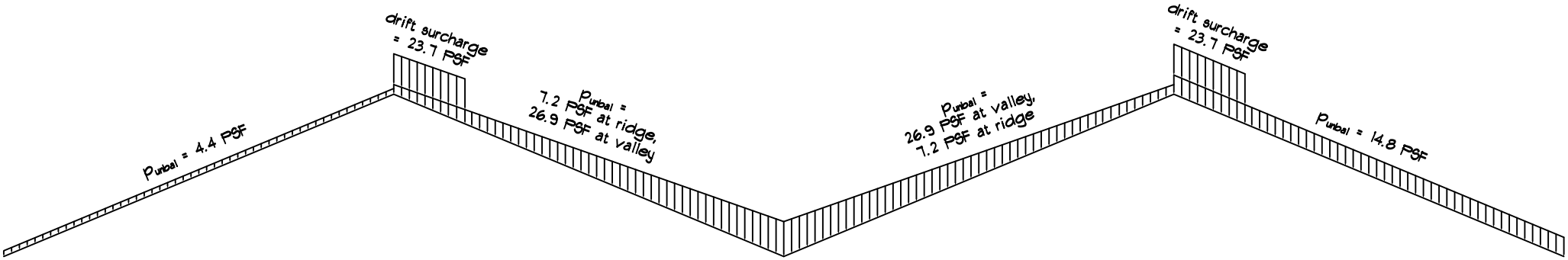
Determine Unbalanced Snow Load

Determine snow density.

Snow density, γ =		16.6	PCF - from Equation 7.7-1, Section 7.7.1

Determine unbalanced condition

Is W ≤ 20 feet?	No		
Do rafters span ridge to eave?	No		
Windward side snow load =		**4.4**	**PSF** - from 7.6.1
Leeward side snow load =		**14.8**	**PSF** - from 7.6.1
Since W = lu > 20 ft, hd =		2.21	feet - from Figure 7-9
Drift surcharge =		**23.7**	**PSF**
from ridge to		9.12	feet downwind of ridge See Figure 7-5


drift surcharge
= 23.7 PSF
drift surcharge
= 23.7 PSF
p_{unbal} = 4.4 PSF
p_{unbal} =
7.2 PSF at ridge,
26.9 PSF at valley
p_{unbal} =
26.9 PSF at valley,
7.2 PSF at ridge
p_{unbal} = 14.8 PSF