

Snow Loads

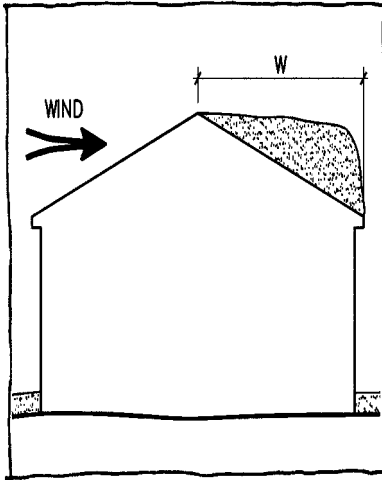
**Guide to the Snow Load
Provisions of ASCE 7-10**

Michael O'Rourke, Ph.D., P.E.



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Snow Loads

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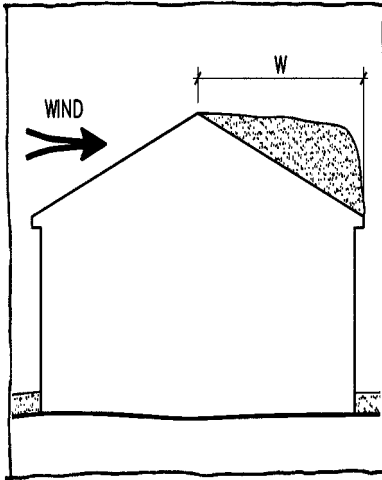
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Contents

Preface	vii
Unit Conversions	ix
1. Introduction	1
2. Ground Snow Loads	5
2.1 Influence of Latitude, Elevation, and Coastlines	6
2.2 Site-Specific Case Studies	7
Example 2-1: Ground Snow Loads	9
3. Flat Roof Snow Loads	11
3.1 Measured Conversion Factors	11
3.2 Flat Roof Snow Load	16
3.3 Exposure Factor (C_e)	17
3.4 Thermal Factor (C_t)	19
3.5 Importance Factor (I_s)	20
3.6 Minimum Snow Loads for Low-Sloped Roofs	21
Example 3-1: Roof Exposure	22
4. Sloped Roof Snow Loads	25
4.1 Snow Sliding	25
4.2 Balanced Roof Snow Load for Common New Construction	28
Example 4-1: Uniform Roof Snow Load, Monoslope Roof (1 on 12)	28
Example 4-2: Uniform Roof Snow Load, Monoslope Roof (4 on 12)	30
Example 4-3: Uniform Roof Snow Load, Wide Gable Roof	31
5. Partial Loads	33
5.1 Continuous-Beam Systems	33
5.2 Other Structural Systems	35
Example 5-1: Uniform and Partial Snow Loads, Monoslope Roof with Overhang	37
Example 5-2: Partial Snow Load, Continuous Purlins in Gable Roof (1 on 12)	39
Example 5-3: Partial Snow Load, Continuous Purlins in Gable Roof (3 on 12)	40
Example 5-4: Partial Snow Load, Cantilevered Roof Girder System	42
6. Unbalanced Loads	45
6.1 Hip and Gable Roofs	45
6.2 Curved Roofs	49
6.3 Sawtooth-Type Roofs	50
6.4 Domes	51

Example 6-1: Unbalanced Snow Load, Narrow Gable Roof.	51
Example 6-2: Unbalanced Snow Load, Wide Gable Roof.	52
Example 6-3: Unbalanced Snow Load, Asymmetric Gable Roof.	53
Example 6-4: Balanced and Unbalanced Snow Load, Curved Roof.	54
Example 6-5: Unbalanced Snow Load, Sawtooth Roof	56
7. Drifts on Lower Roofs	59
7.1 Leeward Drift.	60
7.2 Windward Drift	67
7.3 Adjacent Roofs.	68
Example 7-1: Roof Step Drift Load	69
Example 7-2: Roof Step Drift, Limited Height	71
Example 7-3: Roof Step Drift, Low Ground Snow Load	72
Example 7-4: Roof Step Drift, Adjacent Structure	74
8. Roof Projections.	77
Example 8-1: Parapet Wall Drift	79
Example 8-2: Rooftop Unit (RTU) Drift.	81
Example 8-3: Parapet Wall Drift, Low Ground Snow Load	82
9. Sliding Snow Loads	85
9.1 Adjacent Roofs.	85
9.2 Separated Roofs	88
Example 9-1: Sliding Snow Load, Residential Gable Roof (4 on 12).	88
Example 9-2: Sliding Snow Load, Commercial Gable Roof (1 on 12).	90
Example 9-3: Sliding Snow Load, Separated Roof	91
10. Rain-on-Snow Surcharge Loads	93
Example 10-1: Uniform Design Snow Load, Monoslope Roof ($\frac{1}{4}$ on 12)	96
Example 10-2: Uniform Design Snow Load, Gable Roof ($\frac{1}{4}$ on 12).	97
11. Ponding Instability and Existing Roofs.	99
11.1 Ponding Instability	99
11.2 Existing Roofs	100
12. Design Examples	101
Design Example 1.	101
Design Example 2.	108
Design Example 3.	113
13. Frequently Asked Questions.	119
References	143
Appendix	145
Index	161
About the Author.	165

Preface

This guide provides practicing structural engineers with a detailed description of the snow load provisions of ASCE/SEI Standard 7-10, *Minimum Design Loads for Buildings and Other Structures*, published by the American Society of Civil Engineers (ASCE). The intent of this guide is to present the research and philosophy that underpins the provisions and to illustrate the application of the provisions through numerous examples. Readers and users of this guide will know how to use the provisions and also know the reasoning behind the provisions. In this fashion, users may be able to address nonroutine snow loading issues that are not explicitly covered in ASCE 7-10. Every effort has been made to make the illustrative example problems in this guide correct and accurate. The author welcomes comments regarding inaccuracies, errors, or different interpretations. The views expressed and the interpretation of the snow load provisions made in this guide are those of the author and not of the ASCE 7 Standards Committee or the ASCE organization.

Acknowledgments

The author would like to acknowledge the past and present members of the Snow and Rain Loads Committee of ASCE 7. Without their comments, questions, and discussions, the development of Section 7 in ASCE/SEI Standard 7-10, and subsequently this guide, would not have been possible.

As with any document of this type, many individuals have contributed their hard work and effort. The author acknowledges the work and effort extended by the administrative staff of the Department of Civil and Environmental Engineering at Rensselaer Polytechnic Institute, who assisted in the word processing and preparation of the narrative. The author also would like to acknowledge the sketch work prepared by Christopher Keado, AIA, who graciously contributed the hand-drawn illustrations associated with each chapter.

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Unit Conversions

Measurement	S.I. Units	Customary units
Abbreviations	m = meter (S.I. base unit of length) cm = centimeter km = kilometer ha = hectare L = liter (S.I. base unit of volume) mL = milliliters kg = kilogram (S.I. base unit of mass) g = gram N = Newton ($\text{m} \cdot \text{kg} \cdot \text{s}^{-2}$) Pa = Pascal (N/m^2) kPa = kilopascals J = Joule W = watt kW = kilowatt s = second (S.I. base unit of time) min = minute h = hour day °C = degrees Celsius ppm = parts per million	yd = yard in. = inch mi = mile acre gal = gallon qt = quart lb = pound oz = ounce lbf = pound-force psi = pounds per square inch atm = atmosphere ft·lbf = feet times pound-force Btu = British thermal unit hp = horsepower s = second min = minute h = hour day °F = degrees Fahrenheit ppm = parts per million
Length	1 m = 3.2808 ft = 1.0936 yd 1 cm = 0.3937 in. 1 km = 0.6214 mile	1 ft = 1/3 yd = 0.3048 m 1 in. = 2.54 cm 1 mile = 0.869 nautical mile = 1.6093 km
Area	1 m ² = 10.7643 ft ² 1 km ² = 0.3861 mi ² 1 ha = 2.4710 acre	1 ft ² = 0.0929 m ² 1 mi ² = 2.59 km ² 1 acre = 43,560 ft ² = 0.4047 ha
Volume	1 L = 0.2642 gal 1 ml = 1 cm ³	1 gal = 4 qt = 3.7854 L 1 ft ³ = 7.481 gal = 28.32 L
Mass	1 g = 0.0353 oz 1 kg = 2.2046 lb	1 oz = 28.3495 g 1 lb = 0.4536 kg
Force	1 N = 0.2248 lb/ft	1 lbf = 4.4482 N
Density	1 kg/m ³ = 0.2048 lb/ft ³ 1 kg/m ³ = 6.2427 lb/ft ³	1 lb/ft ³ = 4.882 kg/m ³ 1 lb/ft ³ = 16.018 kg/m ³
Pressure	1 kPa = 0.145 psi	1 psi = 6.8948 kPa 1 atm = 14.7 psi = 101.35 kPa
Energy and Power	1 J = 1.00 W·s = 0.7376 ft·lbf 1 kJ = 0.2778 W·h = 0.948 Btu 1 W = 0.7376 ft·lbf/s = 3.4122 Btu/h 1 kW = 1.3410 hp	1 ft·lbf = 1.3558 J 1 Btu = 1.0551 kJ 1 ft·lbf/s = 1.3558 W 1 hp = 550 ft·lb/s = 0.7457 kW
Flow	1 L/s = 15.85 gal/min = 2.119 ft ³ /min	1 gal/min = 0.1337 ft ³ /min = 0.0631 L/s
Concentration	mg/L = ppm (in dilute solutions)	
Temperature	°C = (°F - 32) × 5/9	°F = (°C × 9/5) + 32
Fundamental	Acceleration of gravity	32.2 ft/s ² = 9.81 m/s ²
Constants and	Density of water (at 4 °C) =	1,000 kg/m ³ = 1 g/cm ³
Relationships	Specific weight of water (at 15 °C) =	62.4 lb/ft ³ = 9,810 N/m ³
	Weight of water	1 gal = 8.345 lb = 3.7854 kg