Determination of Snow Loads as Per ASCE7-22

An Online Continuing Education Course for Engineers

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Credit: 2 Hours / 2 PDH / 2 CPD

Determination of Snow Loads as Per ASCE7-22

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1. Introduction:

Overview:

Structural design is a set of processes that assures that the building is capable of resisting applied loads, fulfilling its functions, and sustaining its stability.

The processes of structural design can be summarized in the following steps:

1. Determination of applied loads.
2. Selecting the economic and proper structural system.
3. Structural analysis of the structural system to get internal actions.
4. Design of structural members to resist internal actions.

The determination of loads is a critical step because any deviation in calculations of applied loads will lead to an underestimate of loads, which may cause structural failures, or it will lead to an overestimation of loads, which may cause uneconomic design.

In this course, we will study the determination of Snow Loads, including ground snow, flat roof snow, and sloped roof snow.

Also, the course covers the loading cases of the snow loads, such as balanced snow load, unbalanced snow load, minimum snow load, partial loading of snow load, rain-on-snow surcharge load, snowdrifts, and sliding snow load, and snow loads on equipment open-frame structures.

At the end of the course, examples covering all cases of snow loads are solved based on the latest edition of ASCE7-22.

This course is the first course of a series related to the determination of loads; all of these courses are independent and do not require any perquisites. The following is the list of related courses:

1. Determination of Dead, Soil Pressure, & Hydrostatic Pressure Loads as Per ASCE7-22.
2. Determination of Live & Roof Live Loads as Per ASCE7-22.
3. Determination of Rain Loads as Per ASCE7-22.
4. Determination of Snow Loads as Per ASCE7-22.
5. Determination of Flood Loads as Per ASCE7-22.
6. Determination of Ice Loads as Per ASCE7-22.
7. Determination of Crane Loads as Per ASCE7-22, MBMA2016, and AISE13.
8. Determination of Wind Loads as Per ASCE7-22.
9. Determination of Seismic Loads as Per ASCE7-22.
10. |Load Combinations as Per ASCE7-22.

This course involves a deep study on the determination of snow loads, according to ASCE7-22-Chapter 7 and also 2018 IBC-Chapter 16.

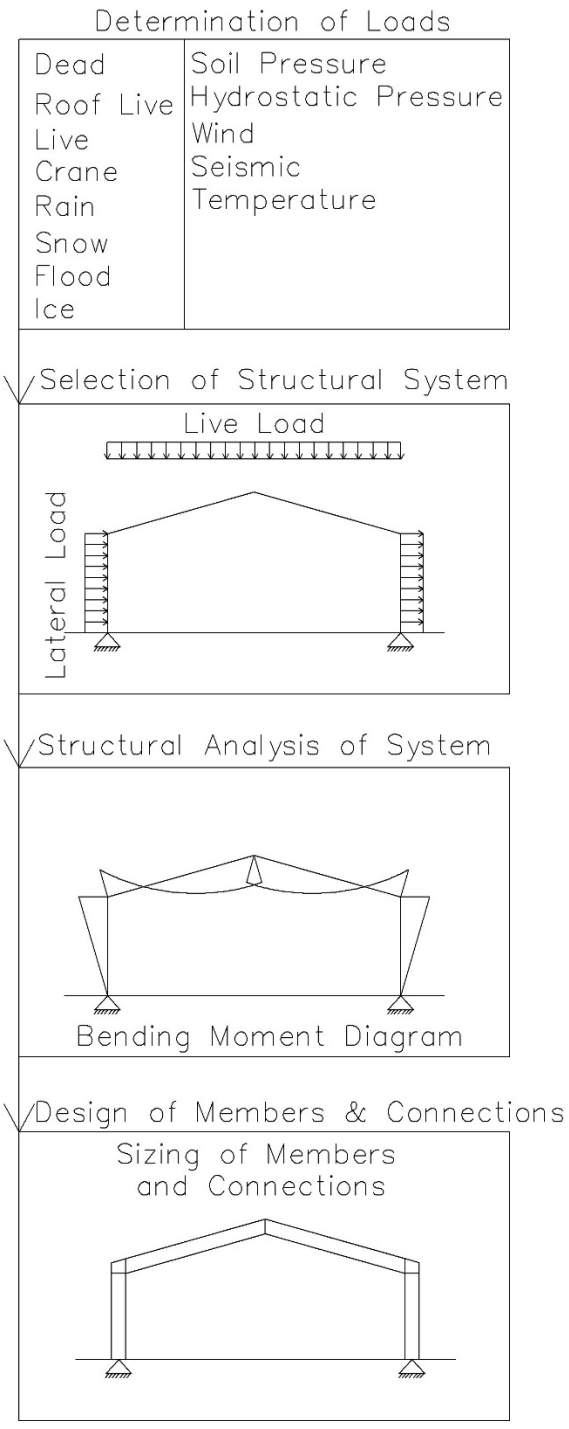

Figure (01). Steps of Structural Design

This course covers the following topics:

1. Ground, flat, and sloped snow load.
2. Load cases of snow load.
3. Balanced snow load.
4. Unbalanced snow load.
5. Minimum snow load.
6. Partial loading of snow.
7. Snow drifts on parapets and lower roofs.
8. Sliding snow load.
9. Rain on snow surcharge load.
10. Snow on open-frame equipment structures.
11. Snow in load combinations.
12. Examples.

2. Ground, Flat Roof, and Sloped Roof Snow Loads:

There are several forms of snow loads, such as ground snow loads, flat roof snow loads, and sloped roof snow loads.

a. Ground Snow Load (P_g):

It is a site-specific weight of the accumulated snow at ground level; its value is based on a 50-year mean recurrence interval, which means that this value has a 2% annual probability of being exceeded.

It is used to determine the flat roof snow load and the sloped roof snow load. Ground snow load (P_g) for most of the United States is determined using the map in ASCE7-Figure (7-2-1).

For other areas such as Alaska, Colorado, Idaho, Montana, Washington, New Mexico, Oregon, and New Hampshire, follow ASCE7-Tables (7.2-1) to (7.2-8) Notes on Figure (7.2-1) and Tables (7.2-1) to (7.2-8):

- Ground snow load values are in lb/ft^2.
- The number in parentheses represents the upper elevation limits in feet for the ground snow load values presented on the map.
- For elevations higher than those on the map or mentioned in the tables, ground snow values shall be approved by Authority Having Jurisdiction.
- For locations where there is a substantial change in altitude over the jurisdiction, the load is applied at and below the cited elevation, with a tolerance of 100 ft (30 m).

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sno p_g), as shown in Figure (02).