Load Calculation

Prelimnary Data

Span = 30.0 m

Length = 30.0 m

Eves Hight = 9.0 m

Ridge Hight = 10.5 m

Prelimnary Calculation

Angle of Roof Truss

tan ø = 1.5/15.0

ø = 5.75°

Length of Principle Rafter

= √(1.5^2+15.0^2)

= 15.07 m

Half Slope Area

= 15.07*6.0

= 90.42

Dead Load

A.C.C. SHEET = 56.0 KN/m2 (IS-875, PART-1)

= 56.0*90.42

= 336.0 KN/m

Wt. OF PURLIN = (64.0*6)/85.0 (ISMC-125)

= 5440.0 KN/m

TOTAL D.L. = 336.0+5440.0

= 5776.0 KN/m

No.	Span	Load

Live Load

Roof Area = 15.07*6.0
=90.42 Sq.m

Live Load = 90.42*0.75
=67.81 KN/m2

Live Load on Rafter= 67.81/15.07
=4.5 KN/m2

No.	Span	Load

Design wind speed (Vz):

From Page-8

Vz= Vb K1 K2 K3 m/sec

Vb= Basic wind speed

From Fig.1 or appendix-A of the code,

Vb= 39 m/sec

K1= Risk cofficient

Table-1 page-11,

K1= 1.0

K2= terrain, height and structure size coefficient

Table-2 page-12,

K2= 1.005

K3= topography factor

Cl 5.3.3.1 page-12,

K3= 1.0

Now,

Vz= Vb K1 K2 K3
= 39*1.0*1.005*1.0
= 39.19499999999999 m/sec

Design wind pressure (Pz):

Pz= 0.6 Vz^2
= 0.6*39.19499999999999^2
= 0.9217488149999996 Kn/m2

Wind Load (F):

Case-1: 0 deg. internal suction

Internal Wind Pressure = 54.0
External wind pressure for windward side wall = 0.7
External wind pressure for leeward side wall = 0.2
External wind pressure for windward side roof = 0.95
External wind pressure for leeward side roof = 0.4
External wind pressure for Front side Gabble wall = 0.5
External wind pressure for Front side Gabble wall = 0.5

No.	Bay Lenght	Wall Windward	Wall Leeward	Roof Windward	Roof Leeward	
1	6.0	302.52	-297.54	-293.39	-296.43	

Case-2: 0 deg. internal Pressure

Internal Wind Pressure = 54.0
External wind pressure for windward side wall = 0.7
External wind pressure for leeward side wall = 0.2
External wind pressure for windward side roof = 0.95
External wind pressure for leeward side roof = 0.4
External wind pressure for Front side Gabble wall = 0.5
External wind pressure for Front side Gabble wall = 0.5

No.	Bay Lenght	Wall Windward	Wall Leeward	Roof Windward	Roof Leeward	
1	6.0	-294.78	299.75	303.9	300.86	

For gabble wall

No.	Bay Lenght	Front Gabble	Back Gabble
1	6.0	-294.78	299.75

Case-3: 90 deg. internal Pressure

Internal Wind Pressure = 54.0

External wind pressure for windward side wall = 0.5

External wind pressure for leeward side wall = 0.5

External wind pressure for windward side roof = 0.8

External wind pressure for leeward side roof = 0.43

External wind pressure for Front side Gabble wall = 0.2

External wind pressure for Front side Gabble wall = 0.7

No.	Bay Lenght	Wall Windward	Wall Leeward	Roof Windward	Roof Leeward	
1	6.0	-301.41	301.41	-303.07	-301.02	

STAAD PLANE

START JOB INFORMATION

ENGINEER DATE 04-Jun-21

END JOB INFORMATION

INPUT WIDTH 79

UNIT METER KN

JOINT COORDINATES

1 0 0 0; 2 0 9.0 0; 3 15.0 10.5 0; 4 30.0 9.0 0; 5 30.0 0 0;

MEMBER INCIDENCES

1 1 2; 2 2 3; 3 3 4; 4 4 5;

SUPPORTS

1 5 PINNED

#*************************************

DEAD LOAD

#*************************************

LOAD 1 LOADTYPE Dead TITLE DEAD LOAD

SELFWEIGHT Y -1 LIST ALL

MEMBER LOAD

2 3 UNI GY -5776.0

#*************************************

LIVE LOAD

#*************************************

LOAD 2 LOADTYPE Live TITLE LIVE LOAD

MEMBER LOAD

```
2 3 UNI GY -4.5
#************************************
#            WIND LOAD
#************************************
#  ********** 0 DEG. WIND INT. SUCTION **********
LOAD 3 LOADTYPE Wind  TITLE 0 DEG. WIND INT. SUCTION
MEMBER LOAD
1 UNI GX 1
2 UNI GY 2
3 UNI GY 3
4 UNI GX 4
#  ********** 90 DEG. WIND INT. SUCTION **********
LOAD 4 LOADTYPE Wind  TITLE 90 DEG. WIND INT. SUCTION
MEMBER LOAD
1 UNI GX 1
2 UNI GY 2
3 UNI GY 3
4 UNI GX 4
#  ********** 90 DEG. WIND INT. PRESSURE **********
LOAD 5 LOADTYPE Wind  TITLE 90 DEG. WIND INT. PRESSURE
MEMBER LOAD
1 UNI GX 1
2 UNI GY 2
3 UNI GY 3
4 UNI GX 4
PERFORM ANALYSIS PRINT ALL
PARAMETER 1
CODE IS800 LSD
CHECK CODE ALL
FINISH
```