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Engineers & Consultants

STABILITY CERTIFICATE

This is to certify that, the Design of structures (refer Annexure) by the **M/S XXX ENERGY LTD** for Solar panel Installation is stable under the following load conditions as per the Indian Standard Codes and Regulations

i. **IS 800:2007 – General Construction of Steel members**
ii. **IS 875:2015 – Dead Load (Self weight of the members)**
Wind Load Condition (55 m/s)

ANNEXURE – Structural Analysis of the Steel members is done under Wind Load Condition

This certificate is issued based on the information and records were furnished by the M/S XXX ENERGY LTD

ANNEXURE

Structural Analysis of the Members under Wind Load condition (55 m/s)

1.1 Load Calculation -

Design of Pressure Wp = 0.6 (V ^{2}) in MPa

Wp = Wind Pressure in MPa

V = Velocity of Wind in m/s

After substituting V= 55 m/s ,

Wp = 0.02 MPa (Wind pressure is applied on the structures in Uplift direction)

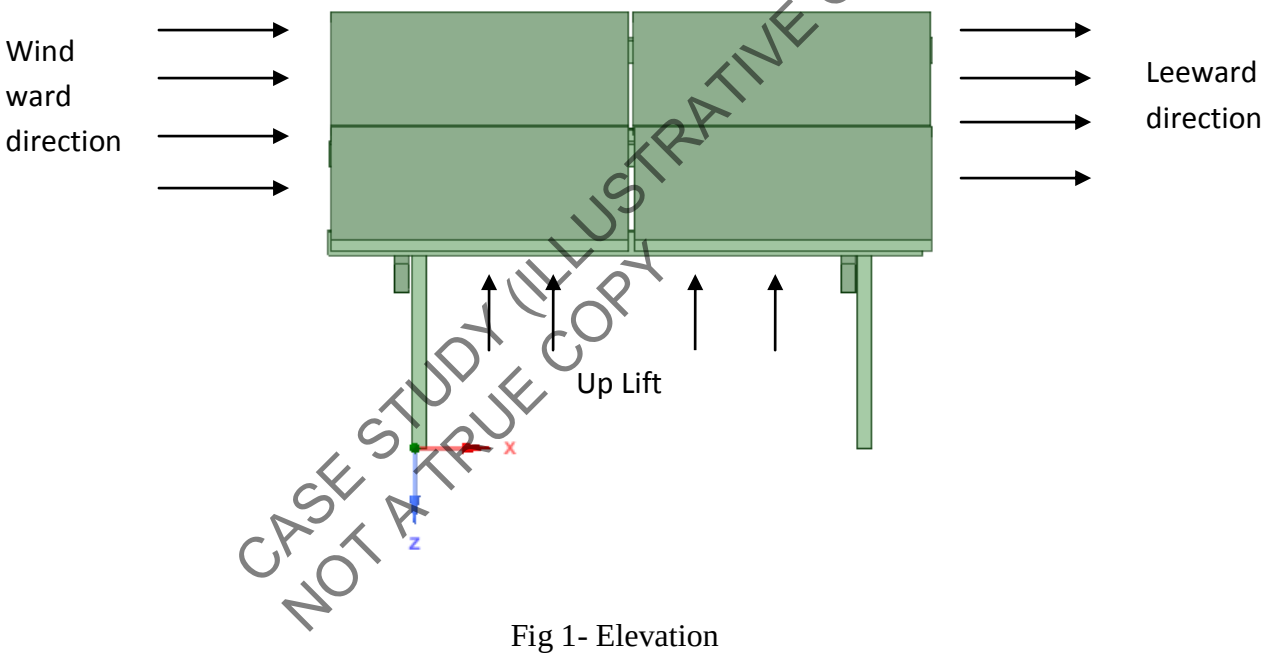


Fig 1- Elevation

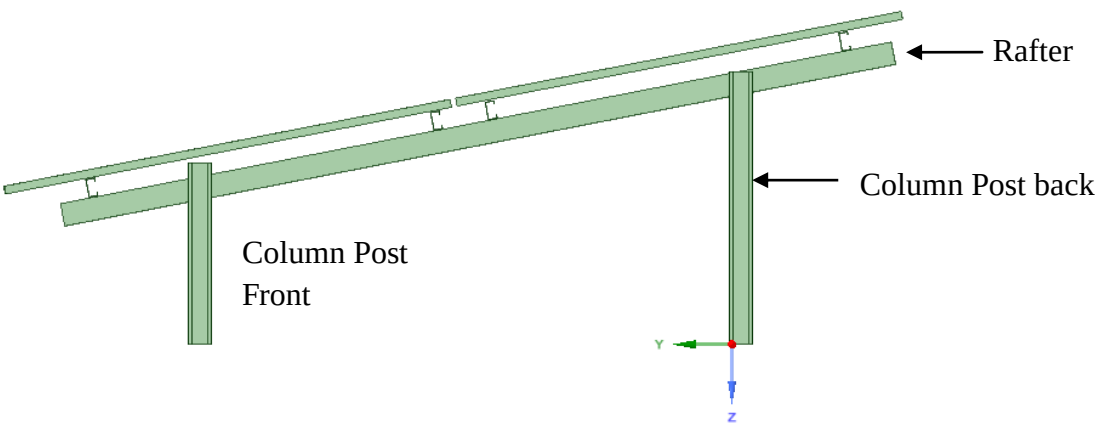


Fig 2 Side View

Dimensions of the Solar Panel - 2000 * 1000 mm – 4 No -(2 * 2 series)

Height of the column Post Front – 800 mm – 2 Nos

Height of the column Post back – 1200 mm – 2 Nos

Length of the Purlin - 2000 mm – 4 Nos

Length of the Rafter - 3730 mm – 2 Nos

1.2 Stress and Strain Results

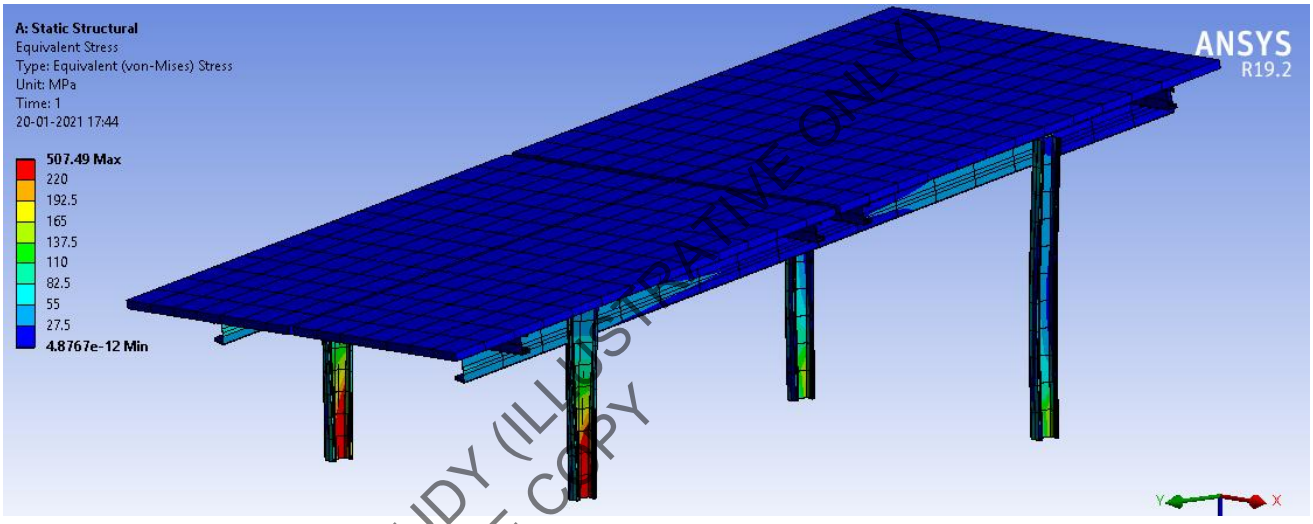


Fig 3 von Mises Stress

For the Analysis purpose bolted joints are neglected and combined as single structure and the bottom of the column post front and back all DOF are Fixed.

Stress found at the column post around 260 MPa , which is considered within the yield limit

Plastic strain is found about 0.01, which means the structure does not undergone any plastic deformation (for structural steel, Plastic strain limit is 0.02)

Structural Analysis of the Aluminum Members under Wind Load condition (55 m/s)

1.1 Mechanical Properties

Density – 2700 kg/ Cubic metre

Young's Modulus – 70 GPa

Alumium Alloy – 6063 T6

Section Type – C-Section

Yield Strength – 160 MPa- 180 MPa

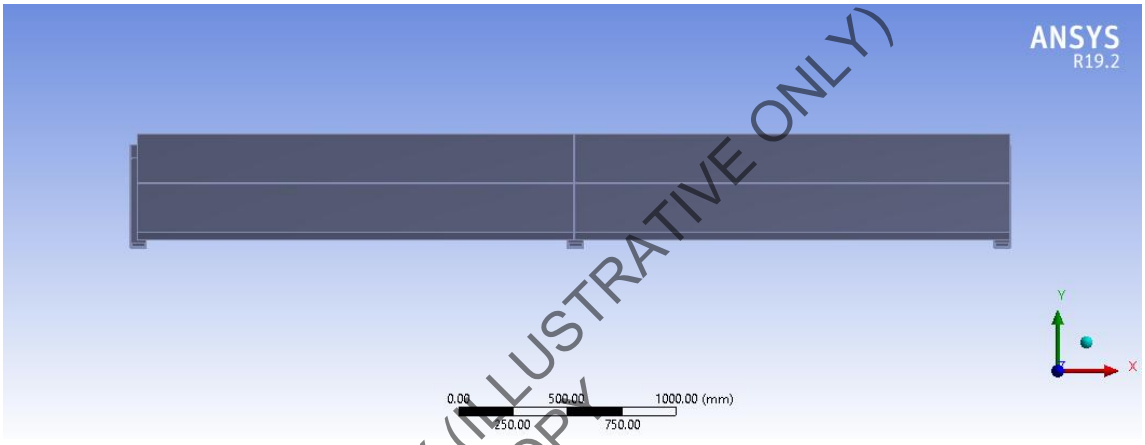


Fig 1.1 Elevation

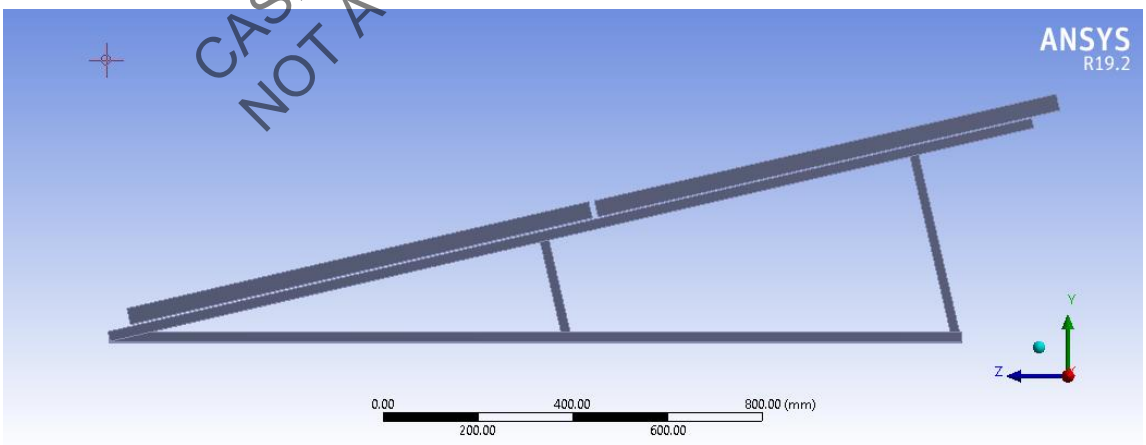


Fig 1.2 Side View

1.2 Analysis and Results

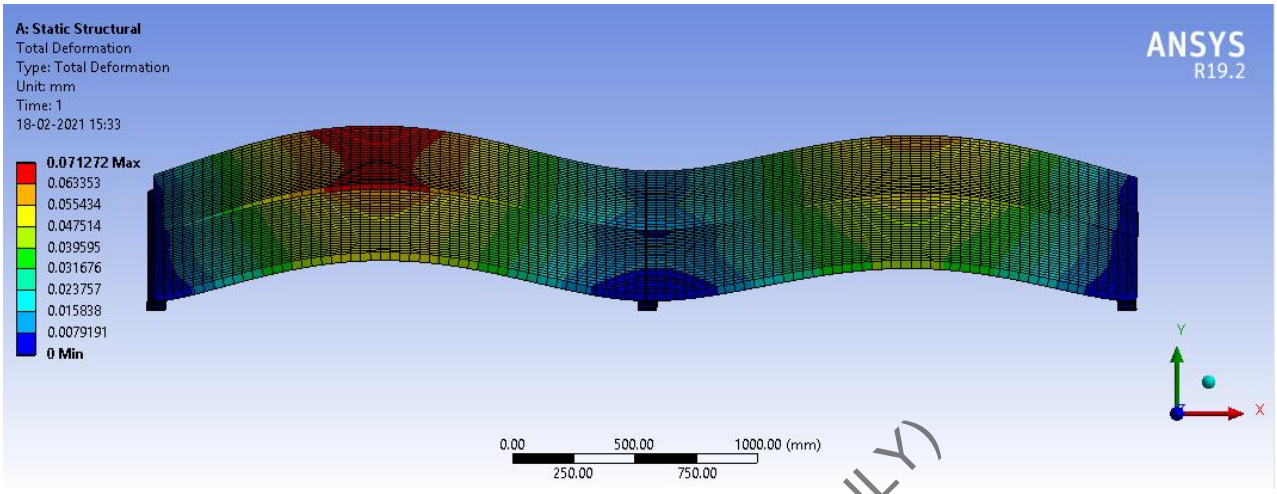
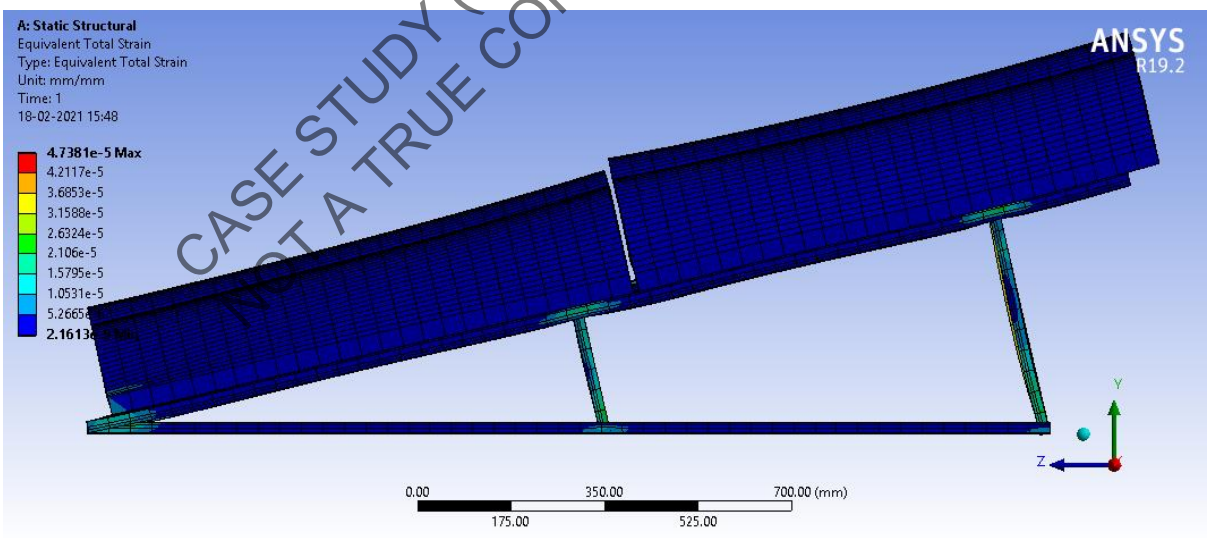


Fig 1.3 Deformation of Panel

Wind load is applied to the panel in Uplift direction (Y –Axis), from the results it is found that the Panel is bending along xy plane , this can be rectified by providing enough supports along x-axis



Aluminum support leg is buckling due to low rigidity of the panel structure

Note :

Support Leg is C- Section and the buckling can be reduced by choosing rectangular section

1.3 Conclusion

Panel stiffness should be improved along lateral side (X- axis), by providing enough support structure.

Brief Note

The Structural support will be stable at maximum wind speed of 40 m/s , when the Installation of the solar panel is done on the roof top buliding with parabet wall of atleast 3 feet height and it should be grounded with concrete slab

The maximum wind load will be absorbed by the building structure and resultant load to the solar panel will not damage the structure as much as possible.

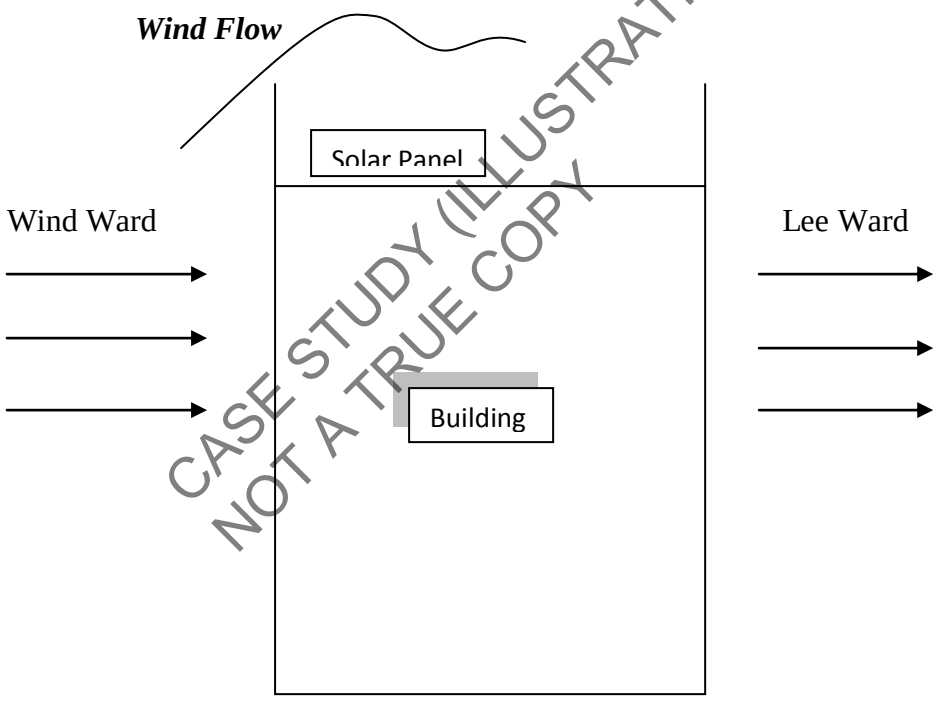


Fig 1.4 Representation Only