Structural Calculation & Analysis For Sunforson system

Wind load calculation and weight ballasted

Wind load	Tilt angle	Panel size
35m/s	25 °	2279*1134*35

Wind load

The design wind speed is 35m/s, according to BS 6399-2:1997 the valuel of the dynamic pressure qs

Wind load： qs=35×35×0.613Pa=751Pa

The size effect factor for external pressures: Ca = 0.952 Refer to figure 4 in BS 6399-2

Refer to Table 13 in BS 6399-2, Take 25 °as design degree

The net pressure overall coefficients: Cpe+ = 1, Cpe- = 0.8

The pressure: pe（+） = Ca×Cpe×qs= 715Pa，

pe（-） = Ca×Cpe×qs= 572Pa

Modules：Wg = 280 N

Length of Modules： La=2279mm

Width of Modules： Lb=1134mm

Area of Modules： Ao = La x Lb=2.59㎡，Pwg=Wg/Ao=108N/㎡

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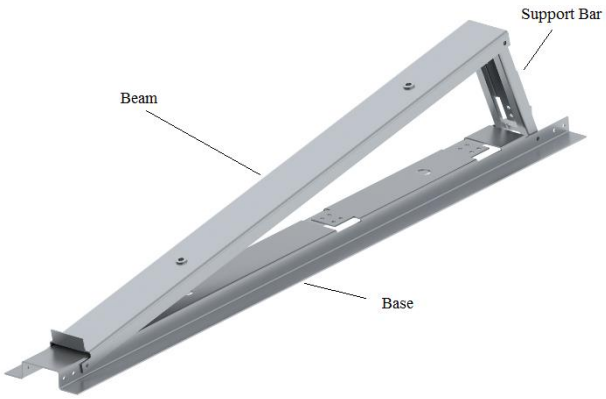
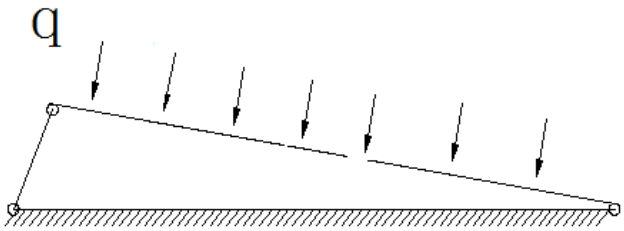
The SFS-FR-02 SunFix Components:



1. Check the Triangular Mounts Group



1) Beam

Material of clamp： 6005- T5

Design strength： pot5=240MPa

Design shear strength： pav=205 MPa

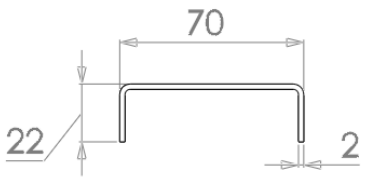
Area of section： A2= 214.85 m ㎡

Second Moment Of Area：

Ix = 8762.46 mm4 Iy =143500.67 mm4

Elastic Modulus:

Wx = 796.58mm3 Wy=4100.02mm3



q=Pe（+）/Lb=0.63N/mm2

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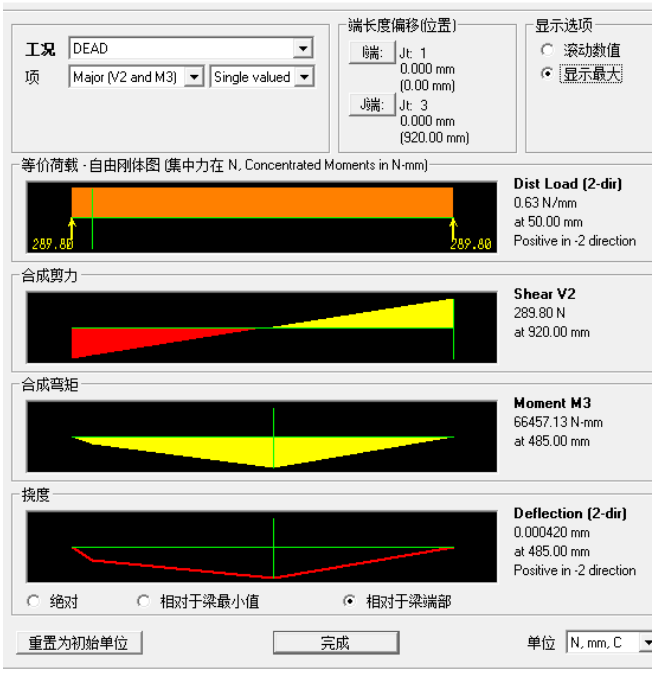
used SAP2000 to analysis

The results are as follows

Main beam



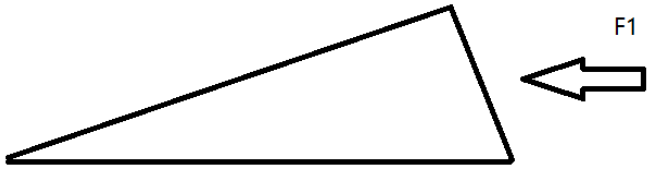
The Max moment is M_{max}=66457N.m

The $\sigma_{max} = M_{max} / Wx$ =60Mpa < pot5=240MPa

So, load capacity is satisfied

2.Check the load weight

Area of Modules： A0 = Lb *La=2.59㎡



Total Wind load: F1=Pe(-)*A0*Sin25=626N

PV weigh Wg=280N

The weight of the concrete pier T=2250N

The coeficieon of friction between rooftop surface and aluminum alloy is: N=0.25

Capricorn of ballasted blocks (m) and system self weight: f=（T+Z）*N≥F1

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