

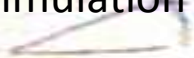
I First Design

Cooling Load: 1016

Heating " : 515

1531 → 1373

ARCH-753-001 Building Performance Simulation

II # 3rd Design →  20° 4th Shade

Cooling Load: 1026.47

Heating Load: 503.60

first Shade

III 2nd Design →  20°

Cooling Load: 984.94

• Heating Load: 530.66

IV 4th Design → all 4 horizontal Shades →  20°

Cooling Load: 1040.96

Heating Load: 483.655

Pegah Mathur

2 November 2015

V 5th Design → 5  middle vertical Shades →

Cooling Load: 918.19

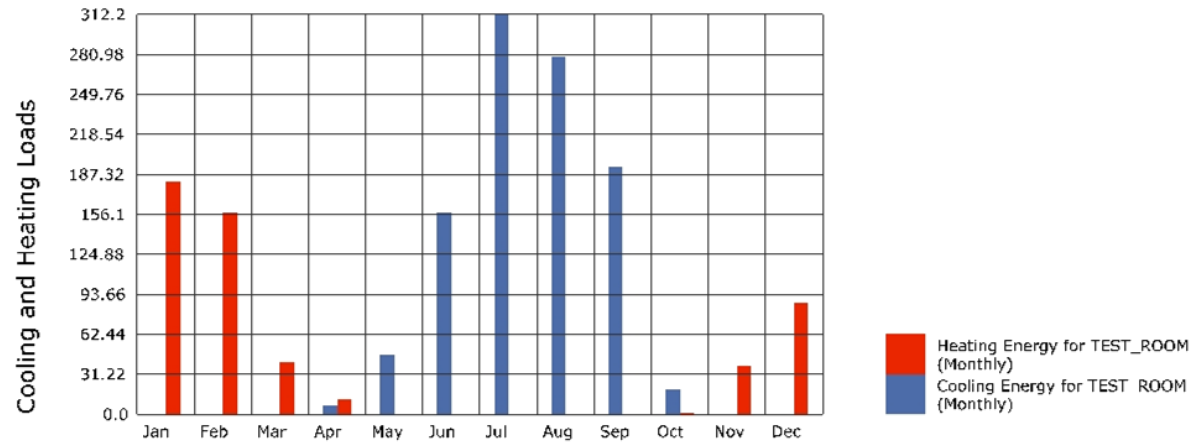
Heating Load: 477.40

0.7 m

0.35

Energy Simulation Report

Base Design Energy Simulation

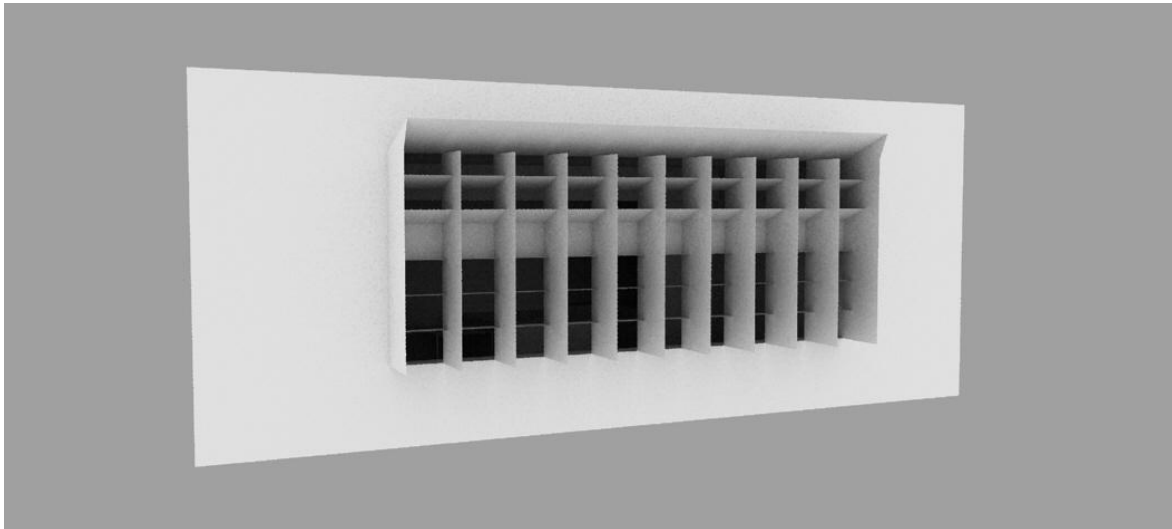


Philadelphia International Ap PA USA TMY3

The initial design energy simulation shows total heating and cooling load of 1531.

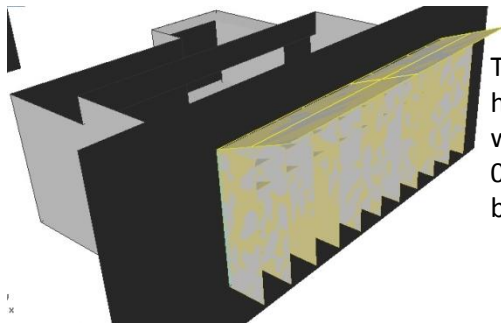
Heating Load: 515

Cooling Load: 1016

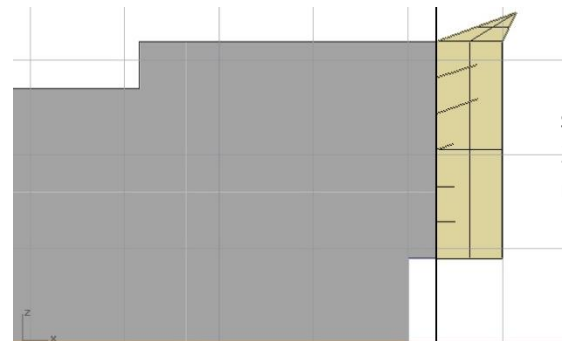


Design transformation process

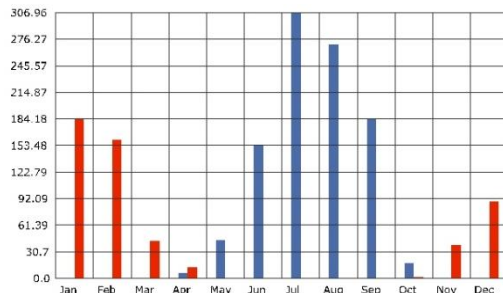
- To reach an optimum design for cooling and heating loads many different alternatives were tried and simulated.
- The challenge is to design for an optimum scenario which shading is reducing the cooling load while is not causing heating load in cold seasons.
- However, even in best scenario, the heating load did not go below 867 and cooling load below 505.



The first upper horizontal shade was extended from 0.85m to 1.30m based on the VSA.

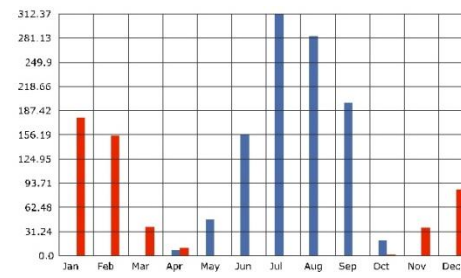


Fourth horizontal shade was rotated 20 for an optimum result.



Heating load:530.66
Cooling Load:984.94

Heating Energy for TEST_ROOM (Monthly)
Cooling Energy for TEST_ROOM (Monthly)



Heating load:503.60
Cooling Load:1026.47

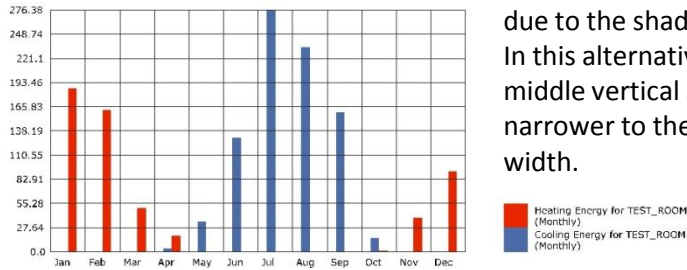
Heating Energy for TEST_ROOM (Monthly)
Cooling Energy for TEST_ROOM (Monthly)

Design transformation process

Best alternative result

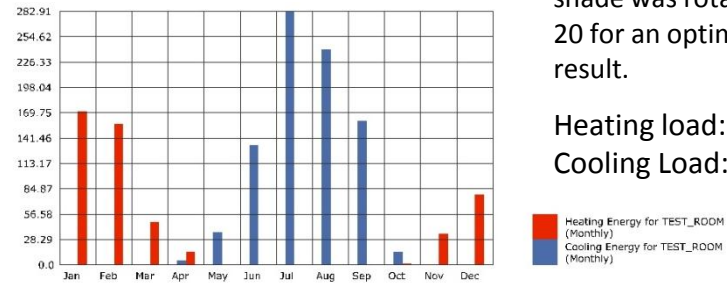
- Best result of total heating and cooling load was 1373.51.

Added to all strategies applied in previous alternates In this last alternative the angle of the upper horizontal shade was changed to 30 which is the maximum angle for optimum horizontal shade.



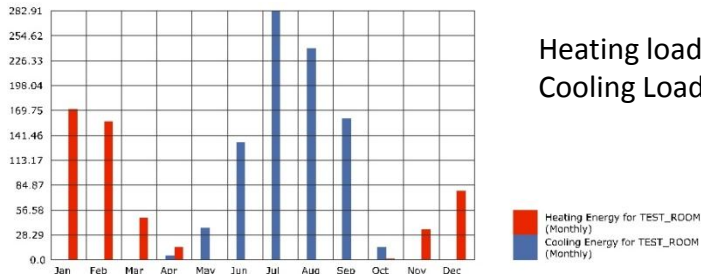
Heating load:477.40
Cooling Load:918.19

Last design alternative was causing much heating load due to the shading. In this alternative the 4 middle vertical shades are narrower to their half width.



Fourth horizontal shade was rotated 20 for an optimum result.

Heating load:549.57
Cooling Load:855.32



Heating load:506
Cooling Load:867.51

