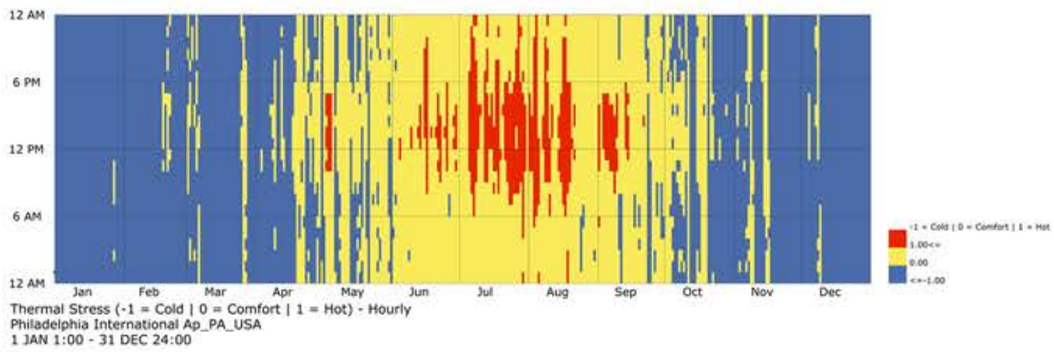
Designing a Shading Device for Meyerson Hall Based on Outdoor Comfort Calculator

Analysis of comfortable hours and thermal stress on three conditions before the design approach :

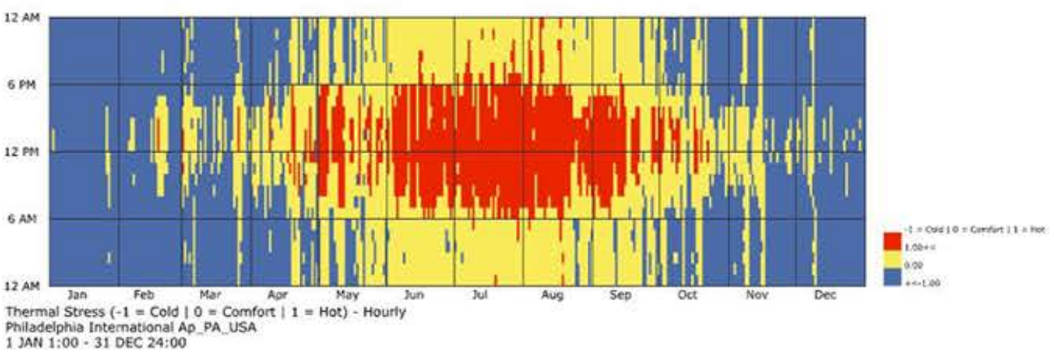
Fully Shaded



Percentage of Comfortable Hours **41.27 %**

Percentage of Heat Stress **3.13 %**

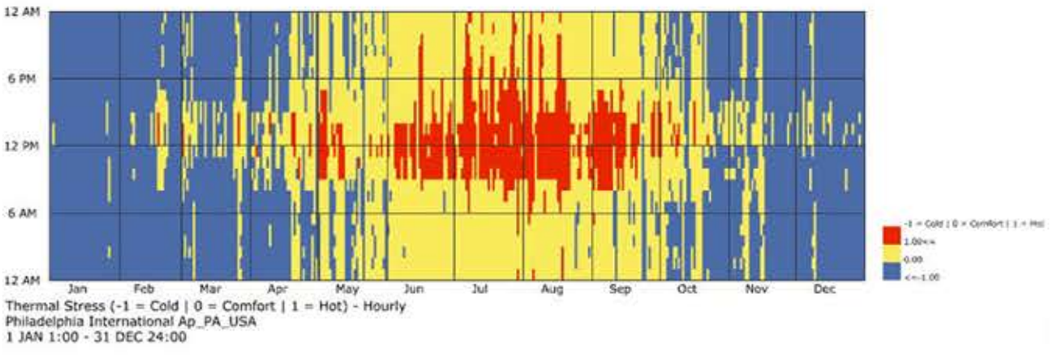
Solar Adjusted



Percentage of Comfortable Hours **39.57 %**

Percentage of Heat Stress **10.23 %**

Meyerson Hall



Percentage of Comfortable Hours **40 %**

Percentage of Heat Stress **6.50 %**

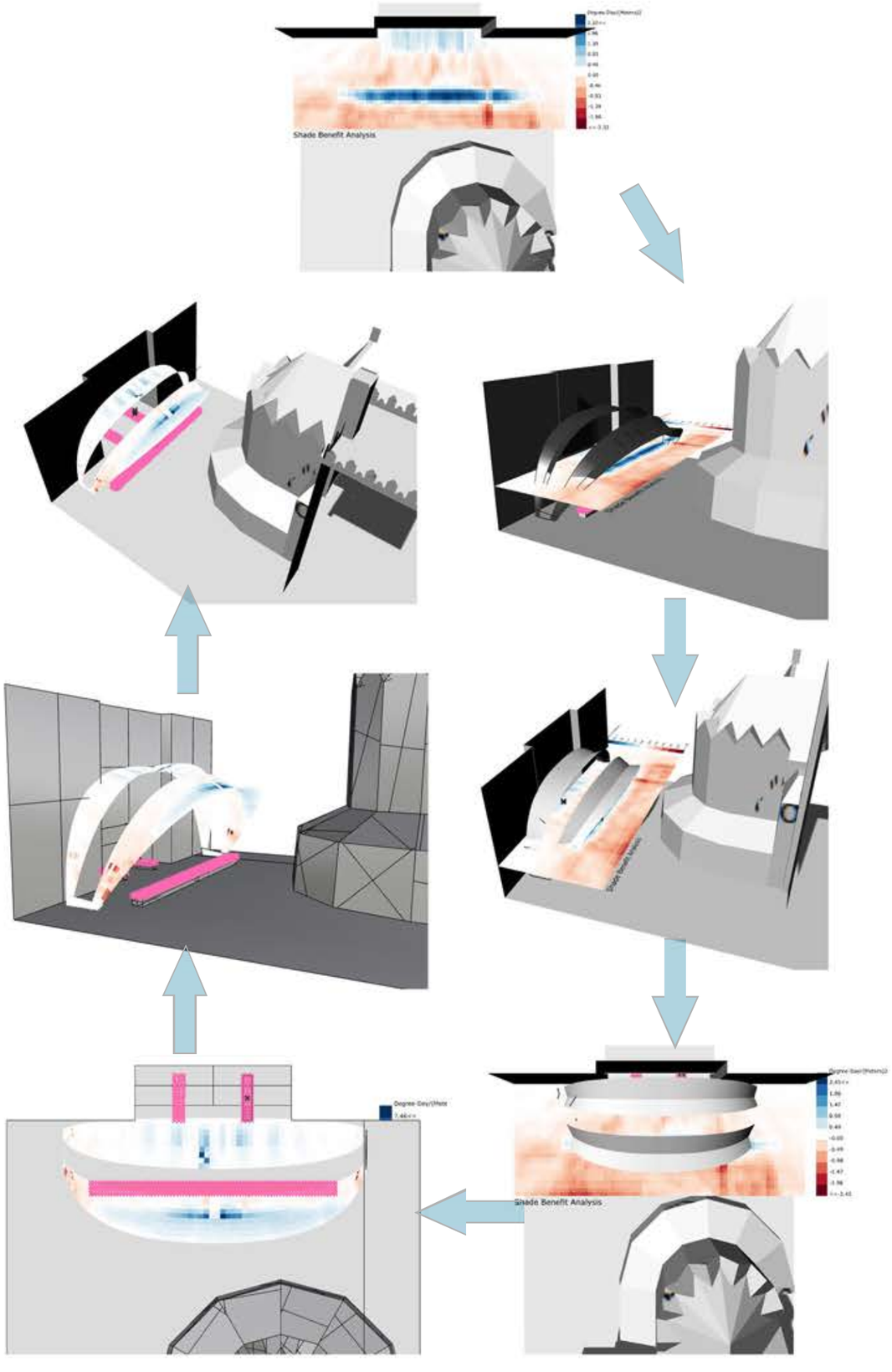
Design Approach Process

In the very first step towards reaching the final design, I drew a large horizontal surface to get a sense of comfort shading benefits. Based on that and with the help of required components, the regions where the shade is beneficial or harmful was determined.

After that I tried to imagine a more complicated shading design in which the regions which are desired to be shaded can be covered. I tried a couple of simple alternatives and each time I tested the result for comfortable hours and thermal stress. Althought the change in percentage of comfortable hours was not changing that much, the thermal stress chart and the percent of heat stress was altering based on different approaches.

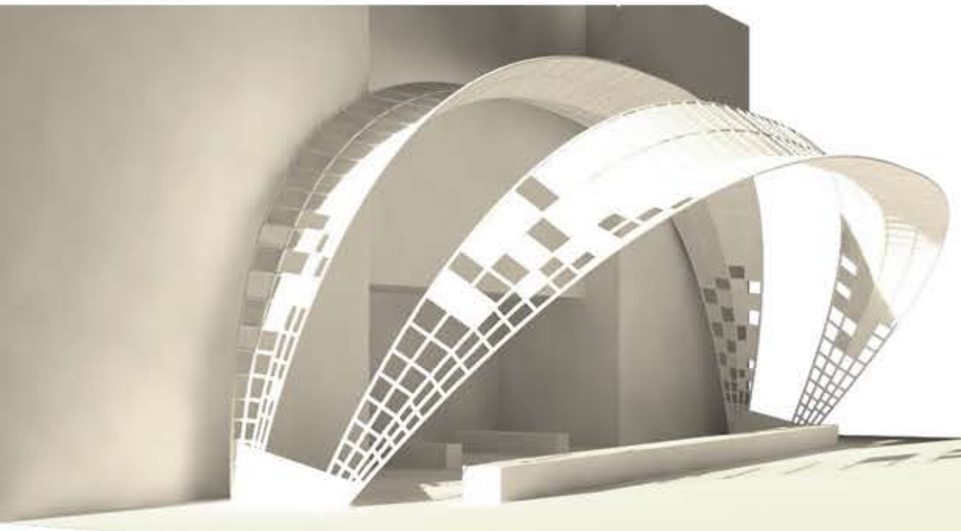
Eventually, a model was reached in a way that it could prevent solar radiation and bring more comfortable hours and also in regions were pereventing sun either would not be in need or would do harm in winter was omitted from the design for most.

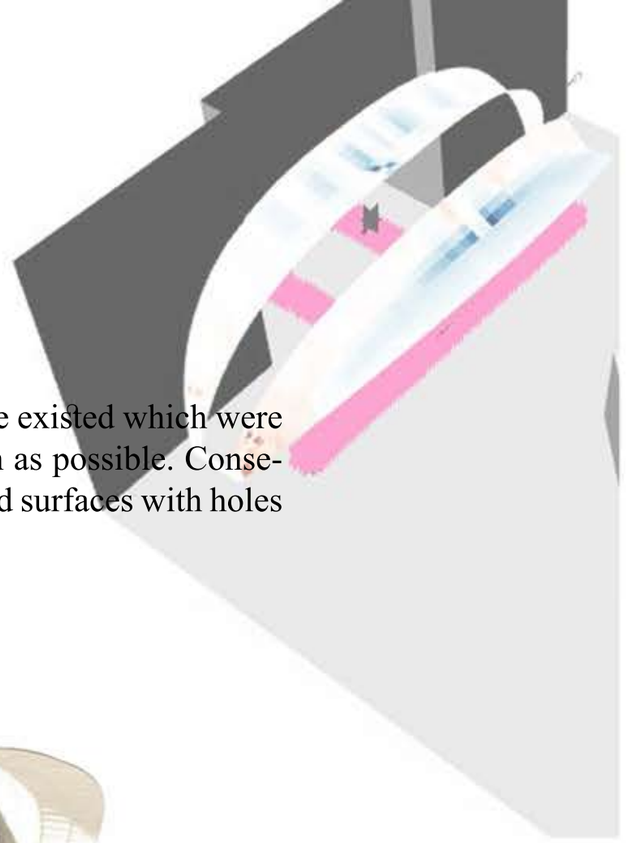
In the final Solution bout 1 percent overally could be added to percentages of comfortable hours which is really low, but I figured out that a great amount of this percentage can be contributed to the times were people are cold in winter. So I checked the percent of heat stress and I saw that the change is more reasonable.



Final Approach

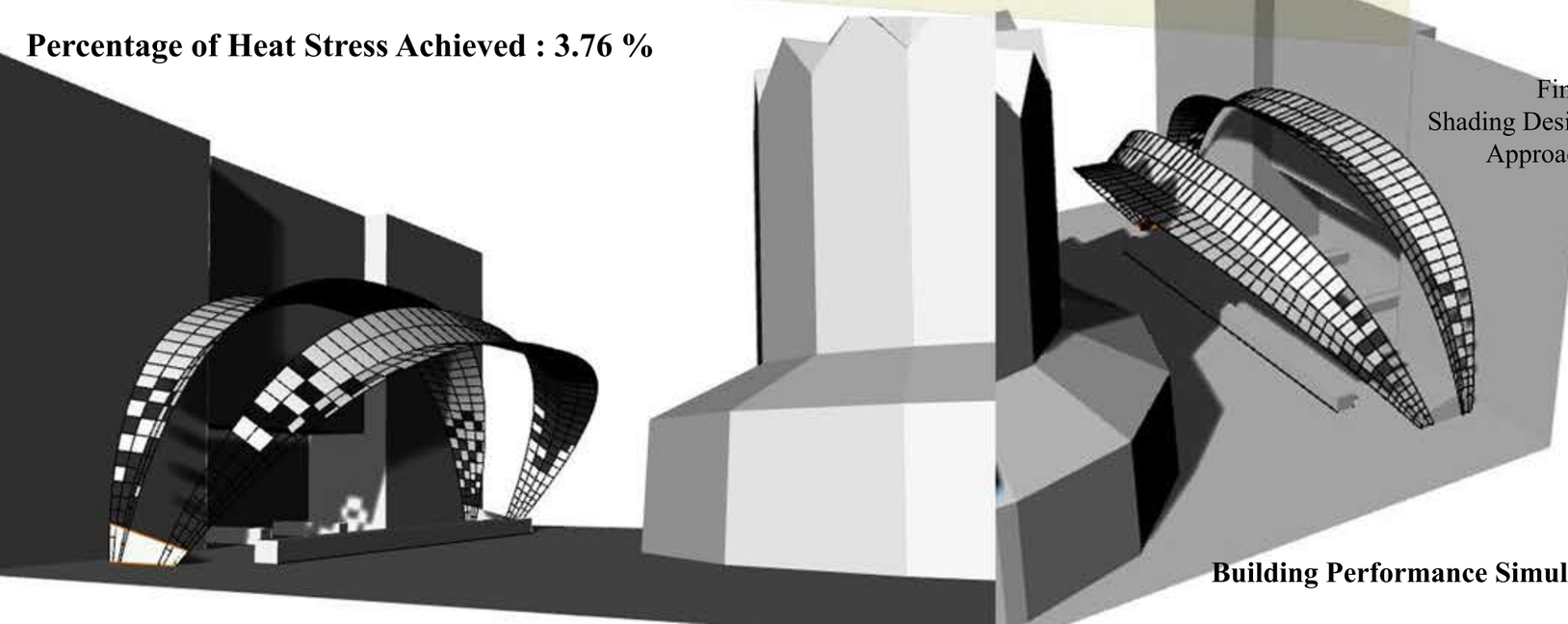
Based on previous model, some red parts were existed which were harmful in winter, so I tried to substract them as possible. Consequently, the final approach contains two curved surfaces with holes regarding to the undesired shading parts.



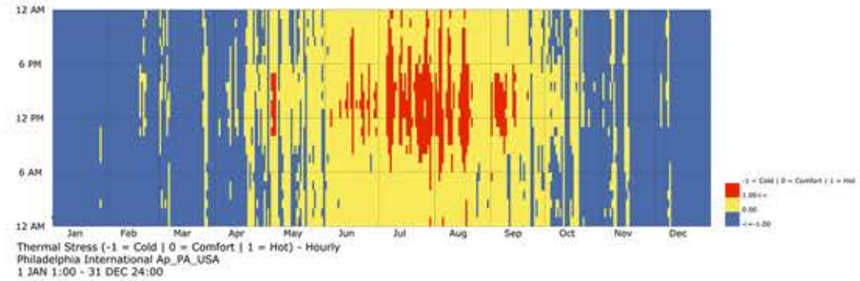


Percentage of Comfortable Hours Achieved: 41.52 %

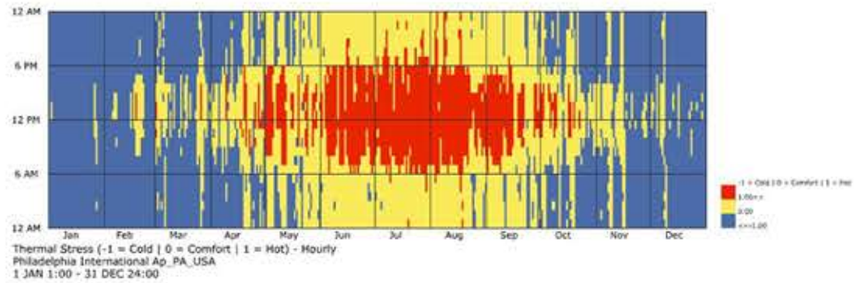
Percentage of Heat Stress Achieved : 3.76 %



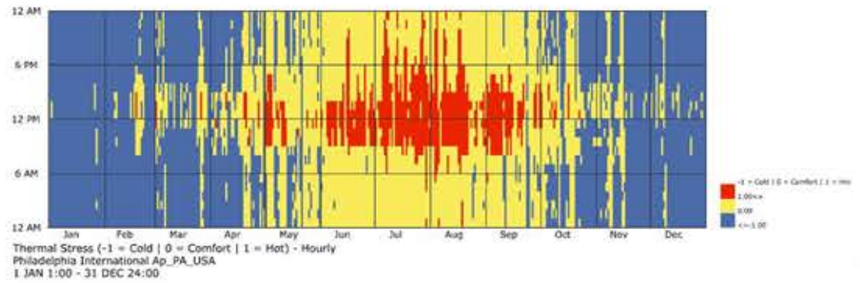
Fully Shaded



Solar Adjusted



Meyerson Hall



Final Shading Design Approach