

ARCH 633  
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BUILDING ENERGY BALANCE REPORT  
11/2/2017

WHAT PARAMETERS ARE THE MOST EFFECTIVE IN BRINGING DOWN THE TOTAL LOAD?

WINDOW TO WALL RATIO:

This parameter is very sensitive but it does not bring down the total load. In fact, it raises it up. Opening one window by 0.2 increased the total load from 303 to 312. So the less open the windows, the better. Furthermore, the total load is sensitive to direction as well. You have a better total load when the South window is open compared to the North.

BLINDS:

This is an effective parameter in bringing down the total load. Especially when balanced properly with a window opening. Adding blinds was able to take my total load from 320 to 310.

CONSTRUCTION:

This is the most effective parameter in bringing down the total load. Increasing the exterior wall, window and roof's R-values reduced my total load from 310 to 190. Furthermore, reducing the air change hour also significantly reduced the total load more.

THERMAL MASS:

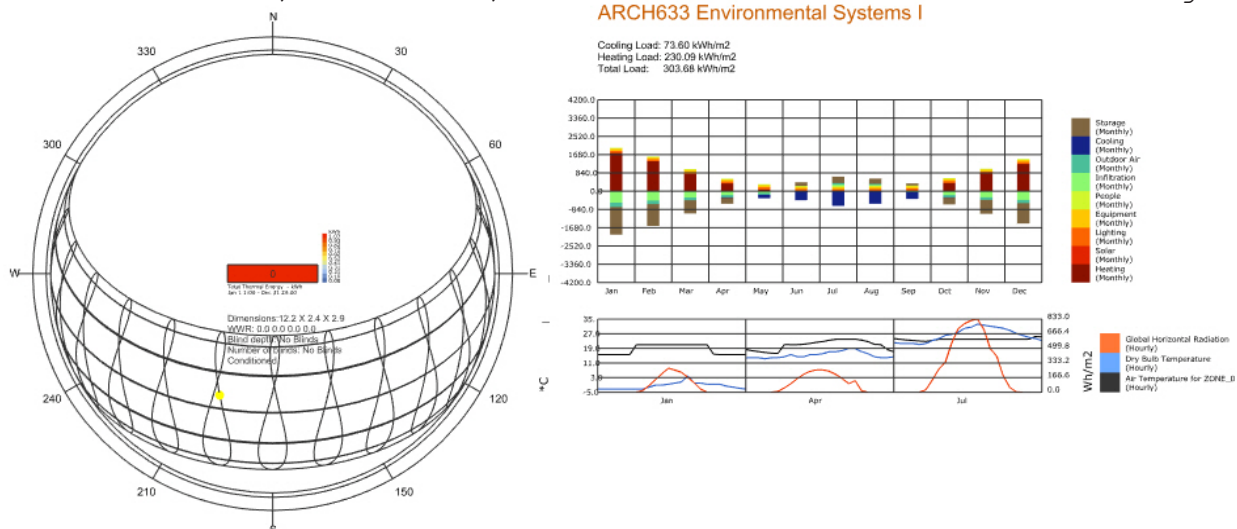
Is not effective either way, Does not significantly reduce or increase total load.

SUMMARY:

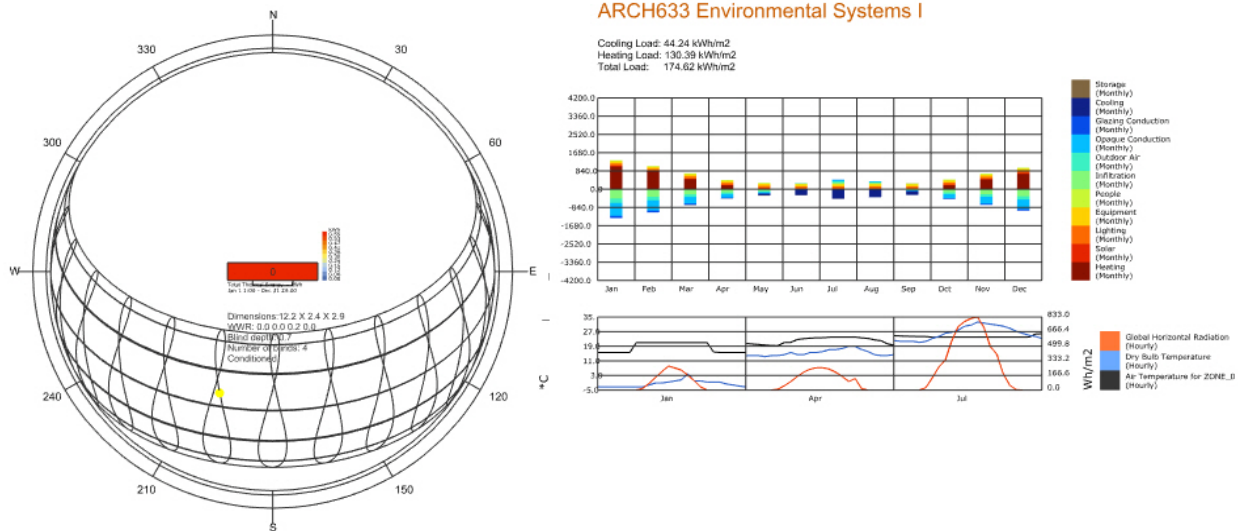
The most effective parameter is CONSTRUCTION. You would also want a smaller window to wall ratio facing the best direction and paired with a proportionally sized blinds.

TESTS:

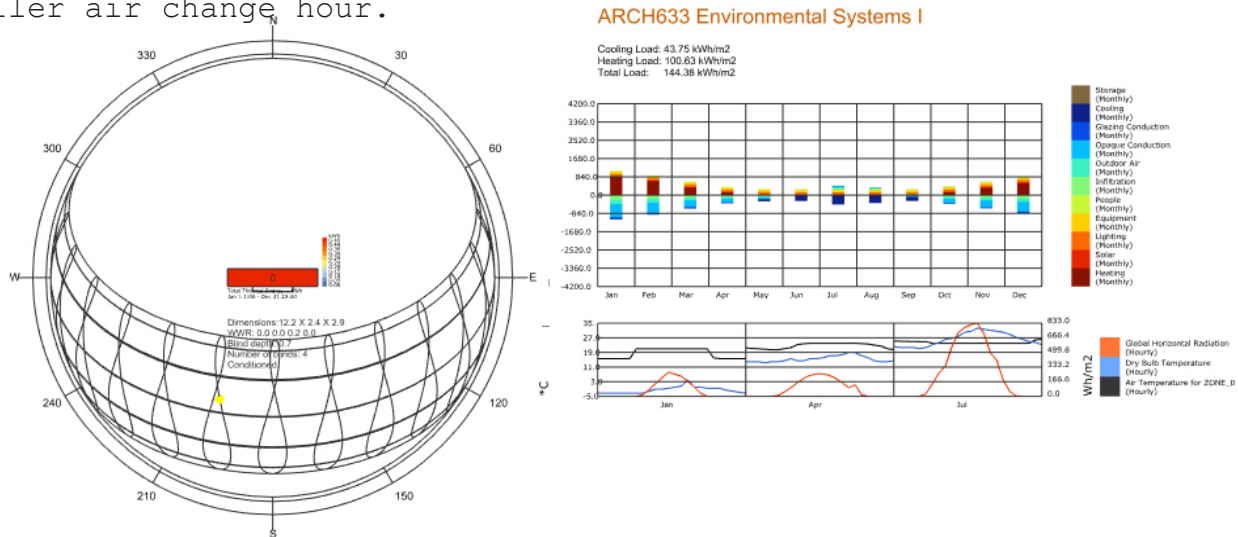
Test 1: No windows, No blinds, Smallest R-values and 2.0 air change hours



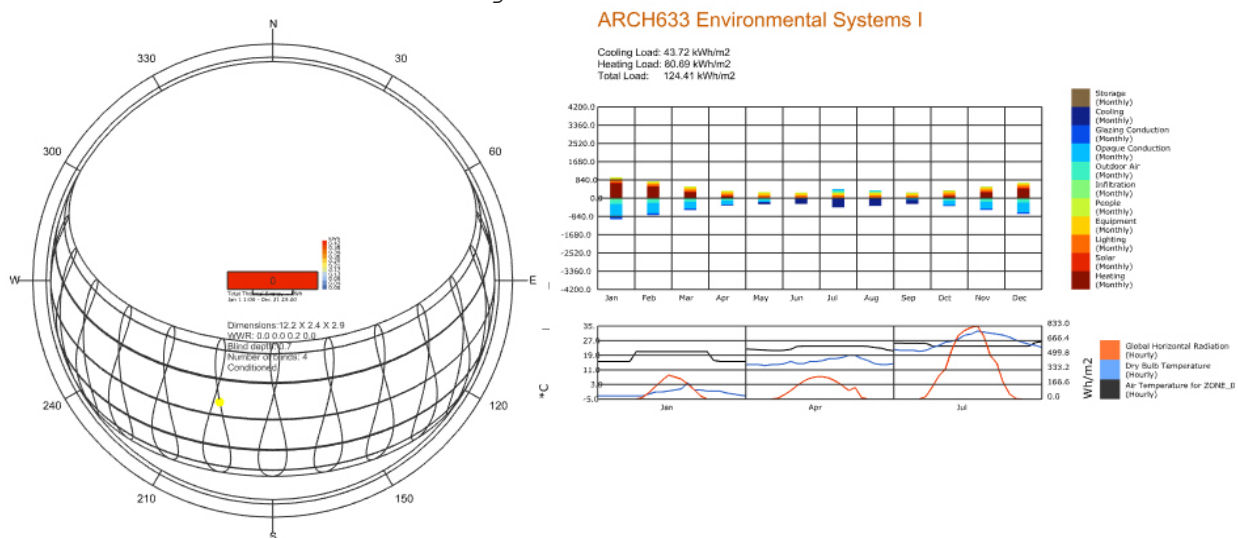
Test 7: Small open South window, medium sized blinds and high R-values.



Test 8: Small open South window, medium sized blinds and high R-values and smaller air change hour.

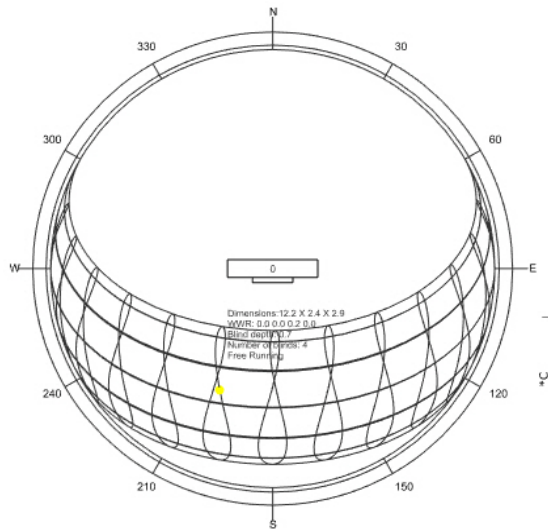


Test 9: Small open South window, medium sized blinds and high R-values and even further reduced air changed hour

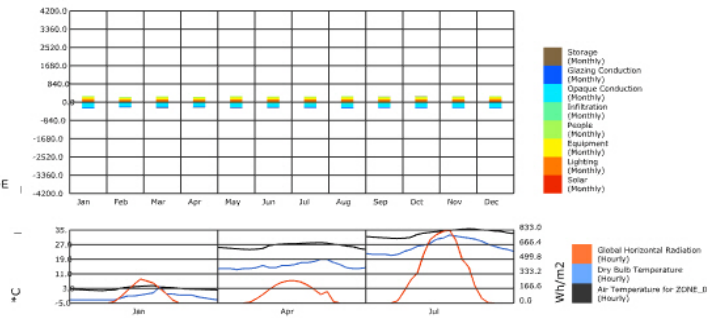


**FINAL LOWEST TOTAL LOAD GOTTEN: 124.41 kWh/m<sup>2</sup>**

WHAT IS THE TEMPERATURE RANGE INSIDE THE CONTAINER IN SUMMER AND WINTER WITH NO SYSTEMS AFTER APPLYING ALL YOUR CHANGES?



### ARCH633 Environmental Systems I



RANGE:

Winter: -4 to 3 degrees

Summer: 21 to 30 degrees

As the ranges are not closer together, the operations failed to be successful.