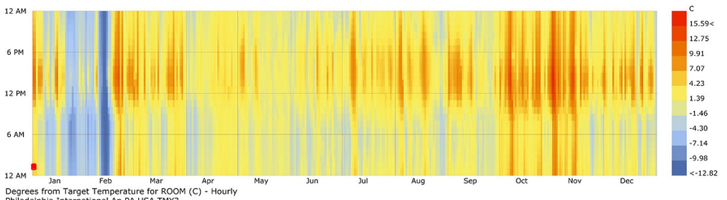
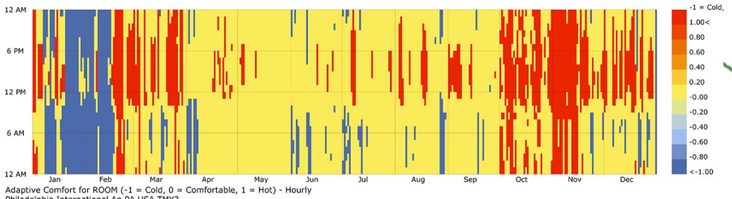
ARCH 753 Building Performance Simulation

Thermal and Visual Comfort Maximization for an Unconditioned Space

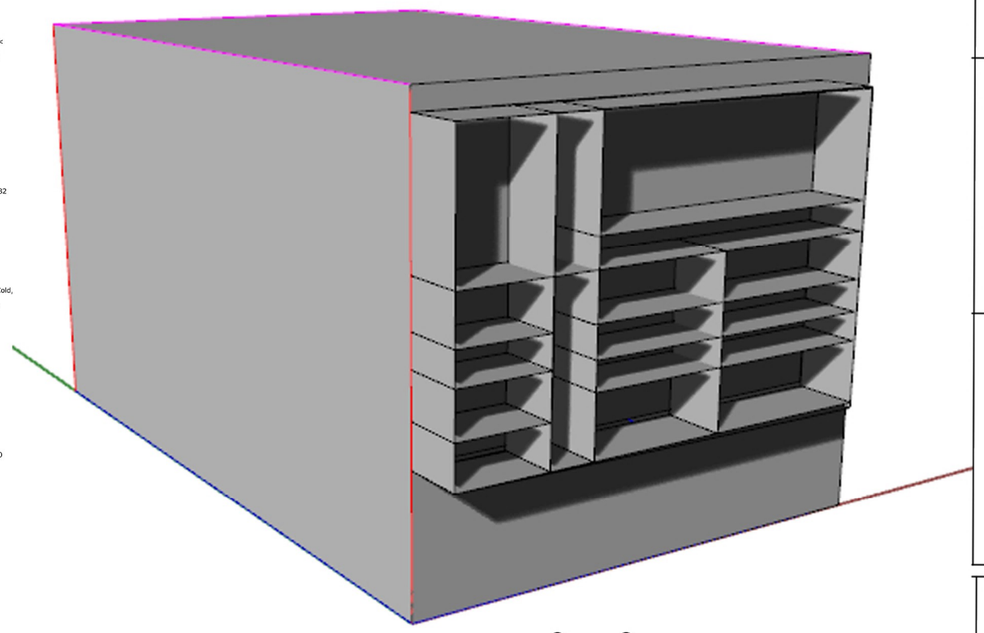
Silmi Farah _MEBD 2017-18

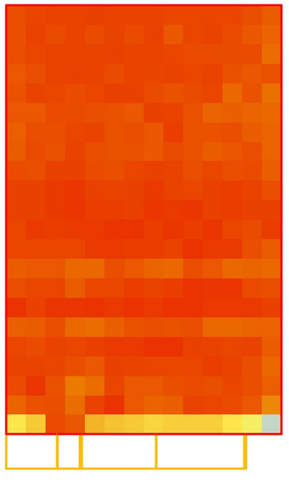


Degrees from Target Temperature for ROOM (C) - Hourly
Philadelphia International Ap PA USA TMY3
1 JAN 1:00 - 31 DEC 24:00



Adaptive Comfort for ROOM (-1 = Cold, 0 = Comfortable, 1 = Hot) - Hourly
Philadelphia International Ap PA USA TMY3
1 JAN 1:00 - 31 DEC 24:00





Annual Useful Daylight Study
Range 300-2000

Thermal Comfort Condition: Condition:

By adding the shading surface and ensuring the passive cooling by adding natural ventilation the room actually improved the thermal comfort level 67% of the time.

It could Improve more if an hourly basis opening and closing window could be introduced to this design according to the energy model analysis comfort chart.

Lighting Condition:

The daylighting grid based analysis shows an uniform distribution and lighting level of 300-2000 lux prevalent in most of the time. However, around the time December noon there is execessive light which was needed for reduction of cold.

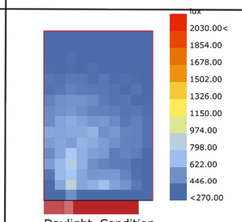
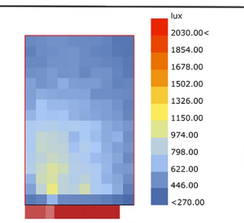
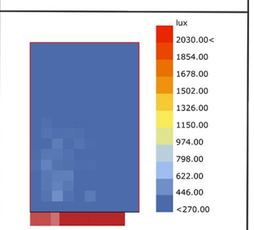
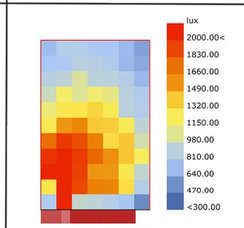
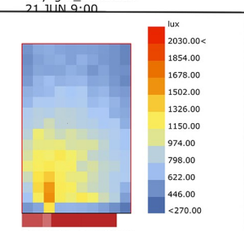
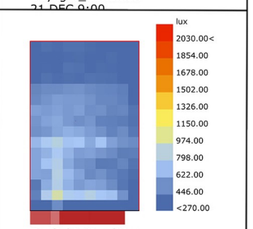
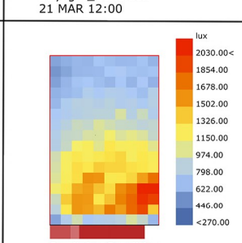
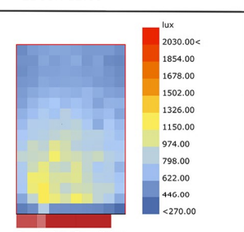
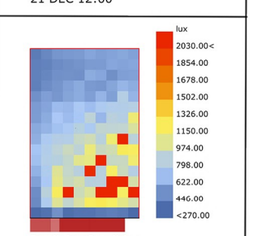
March noon has soem room for improvement yet through some refined properties of Shading like operable shading

Glare Condition:

The glare level is under 0.34 for almost 80% of the time which is in tolerable level of the whole year.

Just the times around december 12pm to 3pm has direct radiation penetrating inside which could not be solved due to the need of radiation for cold

	Baseline	Improvement
Total Comfort	2.12	67.56
Cooling Required	96.89	19.61
Heating Required	0.98	12.81

	MARCH	JUNE	DECEMBER
9 AM	 Daylight_Condition 21 MAR 9:00	 Daylight_Condition 21 JUN 9:00	 Daylight_Condition 21 DEC 9:00
12 PM	 Daylight_Condition 21 MAR 12:00	 Daylight_Condition 21 JUN 12:00	 Daylight_Condition 21 DEC 12:00
3 PM	 Daylight_Condition 21 MAR 15:00	 Daylight_Condition 21 JUN 15:00	 Daylight_Condition 21 DEC 15:00

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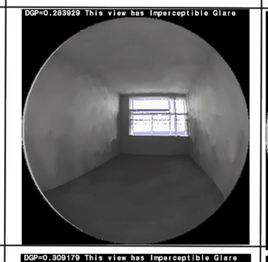
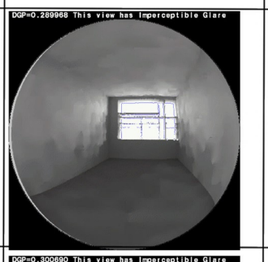
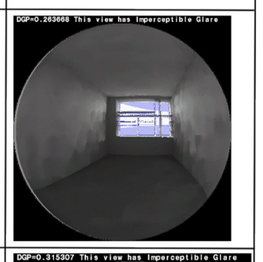
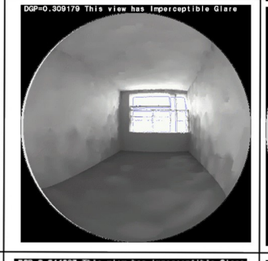
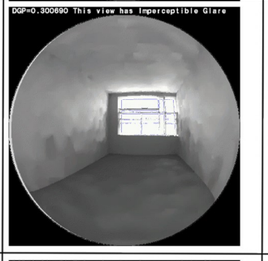
9 AM			
12 PM			
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