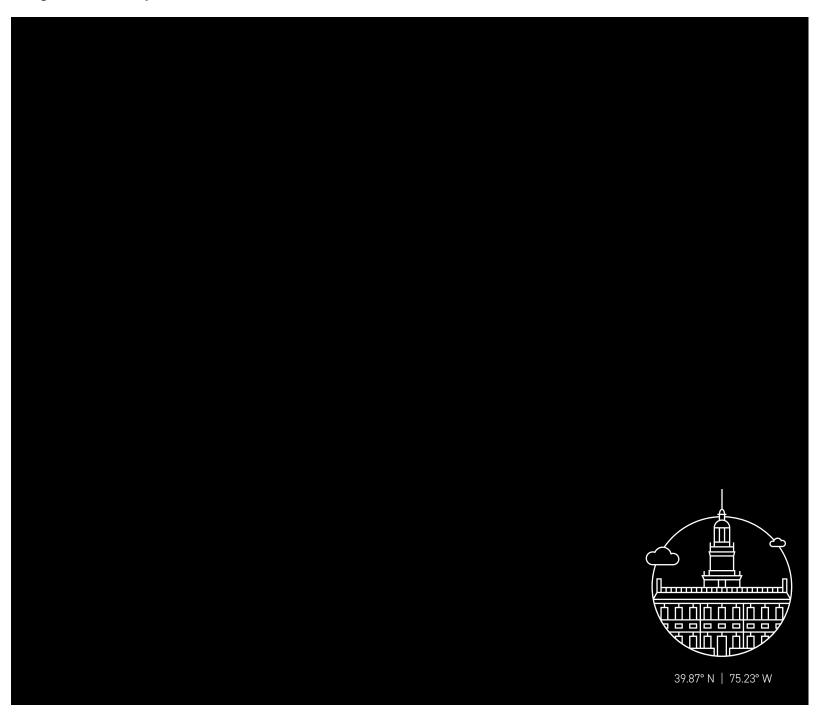
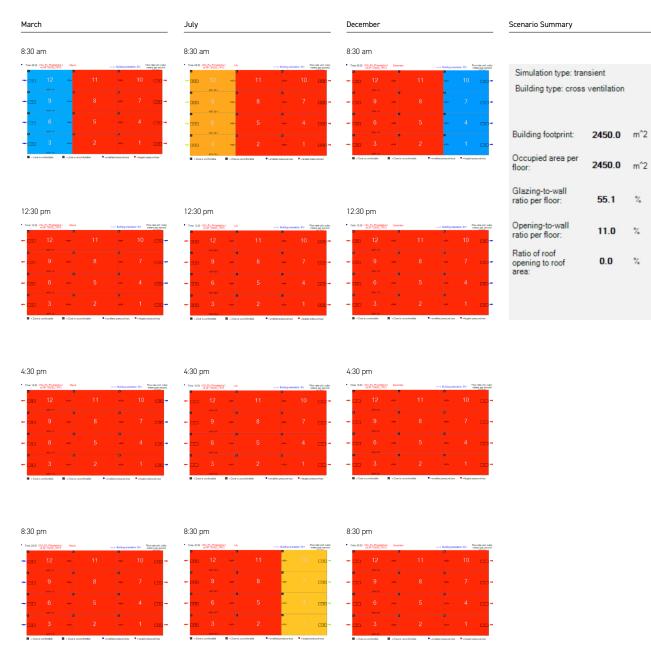
Assignment 08 | Meyerson Ventilation



PennDesign Environmental Systems I Fall 2017 Andrew Matia

Original | Cross Ventilation



Thermal Comfort Analysis

March

917- to 32- to 4	SRT had ST had 17% center of 17% center of total number of occupied haves	18 27 had
93.1% for 33% cold 33% conflort of 31% conflort of dural number of occupied house	98.7% but 1.7% but 1.7% cold 1.7% cold 1.7% conflor of door area of do	git 23 has The old The cold The confert of blass number of deconded hours
317; but 317; cold 51; cold 51; cold 51; cold of superior of drain ember of consent house	98.7% but 1.7% cold 1.7% cold 1.7% cold 1.7% conflor of door over or door over over over over over over over o	git 23. bet 0% odd 17% confort d full full format of decorated of deco
33 % for 33% conflort 33% conflort of those ember of conjust hours	88.7% but 87.7% but 17.7% confloat of 17.7% confloat of 17.7% confloat of door	30.20 late To fail 17% combat of 17% combat of floored

July

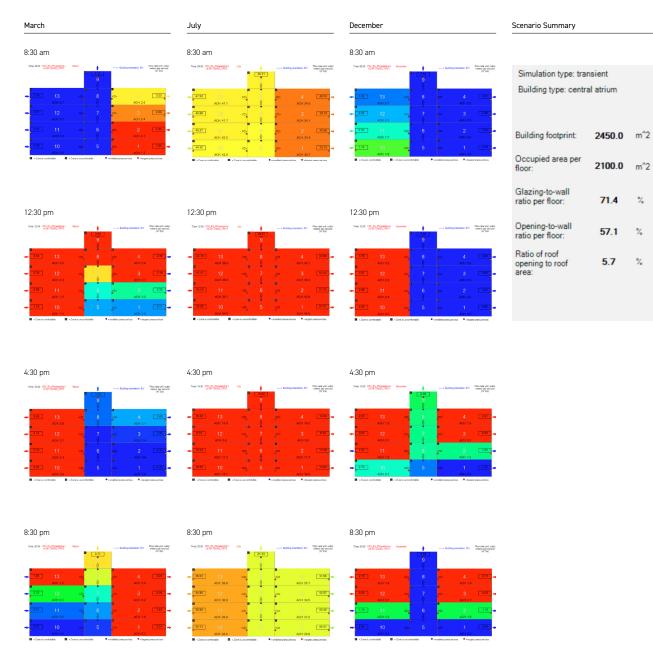
•	91.7% bot (7% cold 9.3% comfort of total number of eccupied hours	6 11	95% hot 0% cold 5% comfort of total number of occupied hours	•	10	81.7% hot 0% cold 18.3% comfort of total number of occupied hours
•	93.3% hat 67% cold 6.7% confort of total number of occupied hours	8	95% hot 0% celld 5% comfort of total number of occupied hours	•	7	91.7% hot 0% cold 18.3% comfort of total number of occupied hours
•	91.7% had 67% cold 8.3% comfort of total number of excepted hours	6 5	95% hot 0% cold 5% comfort of total number of occupied hours	•	4	81.7% hot 0% cold 18.3% comfort of total number of occupied hours
•	91.7% but 0% cold 33% comfort of total number of occupied hours	e 2	95% hot 0% cold 5% comfort of total number of occupied hours	•	1	81.7% hot 0% cold 18.3% comfort of total number of occupied hours

December

•	10 4	95.7% hot 1.7% cold (7% confact otal number of cupied hours	-	11	96.7% hot 1.7% cold 1.7% comfort of total sumber of occupied hours	•	10	91.7% but 3.3% cold 5% conflot of total number of occupied hours
•	0 4	%7% hot 1.7% cold 1.7% confact of the confact object forms	•	8	96.7% hat 1.7% cold 1.7% confort of total number of occupied hours	•	7	91.7% but 33% cold 5% confort of total number of occupied hours
•	0 4	95.7% hot 1.7% cold 1.7% confact obal number of expired hours	•	5	96.7% hat 1.7% cold 1.7% confact of total sumber of occupied hours	•	4	31.7% bot 3.3% cold 5% conflot of total number of occupied hours
•	0 4	%7% hot 1.7% cold 1.7% confact total number of coupled hours	•	2	96.7% hot 1.7% cold 1.7% confect of total reamber of occupied hours	•	1	91.7% but 33% cold 5% confort of total number of occupied hours

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Scheme 1 | Central Atrium



Thermal Comfort Analysis

March

		9			
13	73.3% hot 8.3% cold 18.3% comfort f total number of occupied hours	8		4	\$1.7% hot 1.7% cold 36.7% comfort of stall number of occupied hours
12	71.7% hot 8.3% cold 20% confort factal number of occupied hours	7	•	3	58.3% bot 8.3% cold 33.3% confort of total number of occupied hours
11 0	48.3% hot 26.7% cold 25% comfort fatal number of occupied hours	6		2	60% hot 33.3% cold 16.7% confort of total number of occupied hours
10	38.3% hot 43.3% cold 18.3% comfort of total number of occupied hours	5	•	1	26.7% hot 40% cold 33.3% comfort of total number of occupied hours

July

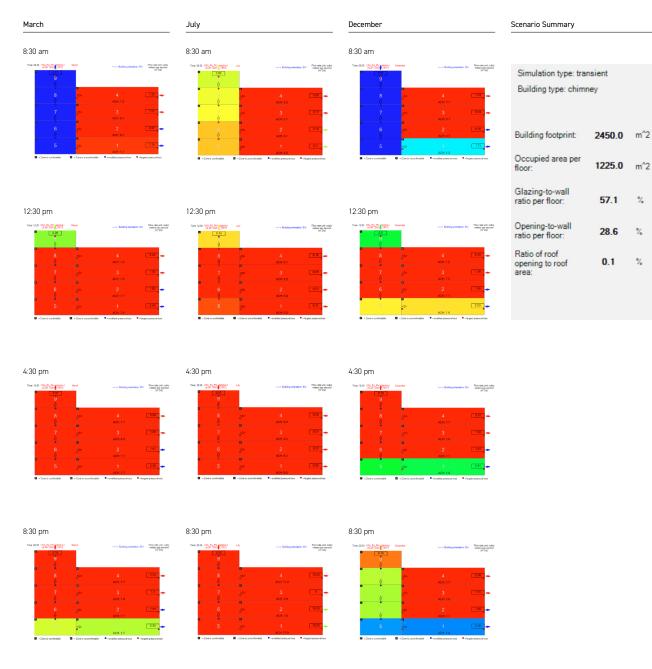
		9			
13	78.3% hot 0% cold 21.7% comfort of total number of occupied hours	8	6	4	78.3% hot O'lt cold 21.7% comfort of total number of occupied hours
12	80% hat 0% cold 20% comfort of total number of occupied hours	7	•	3	78.3% hot O's cold 21.7% comfort of total number of occupied hours
11	78.3% bot 0% cold 21.7% comfort of tost number of occupied hours	6	6	2	78.2% hot 0% cold 21.7% comfort of total number of occupied hours
10	80% hat 0% cold 20% comfort of total number of occupied hours	5	•	1	76.7% hot 0% cold 23.3% comfort of total number of occupied hours

December

		9		
-1	88.3% het 6.7% coelfs 5% comfort of total number of occupied hours	8		48.3% bot 40% cold 11.7% confort of soal number of occupied frours
1	88.3% hot 5% cold 6.7% confort of total number of occupied hours	7		48.3% bot 48.3% cold 3.3% comfort of total number of accupied hours
1	50% hot 6.7% oold 43.3% conflort of hotsin number of occupied hours	6	0	3.3% bot 53.3% colid 43.3% conflor of total number of occupied hours
1	43% het 45% cold 11.7% confect of total number of occupied hours	5	6	93.3% cold 93.3% cold 9.7% comfect of total number of occupied hours

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Scheme 2 | Chimney



Thermal Comfort Analysis

March

9		
8	4	96.3% but 97: cold 177: combat of total number of eccupied hours
7	3	98.3% but 9% cold 17% constant of hald number of eccupied fours
6	2	50.3% bot 3.3% coded 3.3% constant of hald number of eccepted bourn
5	1	61.7% bot 5.7% cold 3.7% cold 3.7% control of total number of occupied bours

July

9		
8	4	55% but 5% cells 5% comfort of total number of occupied hours
7	3	93.3% hot O't; cald 1.7% comfact of total number of occupied hours
6	2	55% bot 0 % cole 5% complet of total number of occupied hours
5	1	50% bot 0 % cole 10% confert of total number of occupied hours

December

9		
8	4	56.7% hot 1.7% colds 1.7% colds 1.7% compared focused flours
7	3	58 3% hot O'v. cold 1.7% content of sotal number of occupied hours
6	2	91.7% hot 8% cold 3.3% condid of soft number of occupied hours
5	1	O't het 133% celel 66.7% cented of total number of occupied hours

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Best Thermal Comfort

Scheme 1: 43.3% comfort during occupied hours in December

Worst Thermal Comfort

Original: 1.7% comfort during occupied hours in December

My assumption was that the current ventilation model for Meyerson was most closely associated with the cross ventilation scheme. This original design rendered on average the worst thermal comfort throughout the year. I believe the biggest reason for this low thermal comfort precentage has more to do with the Opening-to-Wall ratio of Meyerson than it has to do with the overall configuration of the building. While I did try two different schemes for ventilation, a central atrium and chimney, I noticed the biggest increase in overall thermal comfort when I increased the Opening-to-Wall ratio of Meyerson. This was true across all schemes. My estimation is that the current design of Meyerson has an 11% ratio that is made up of small 1 x 2 meter sliding windows on the West and East facades, as well as the few sliding glass doors on the balconies distributed throughtout the building. I progressively increaed this ratio to 57.1% and saw this having the biggest effect on increasing thermal comfort. Additionally, I would conclude that out of the three tested schemes the central atrium configuration has the most potential for high thermal comfort due to natural ventilation throughout the year.