

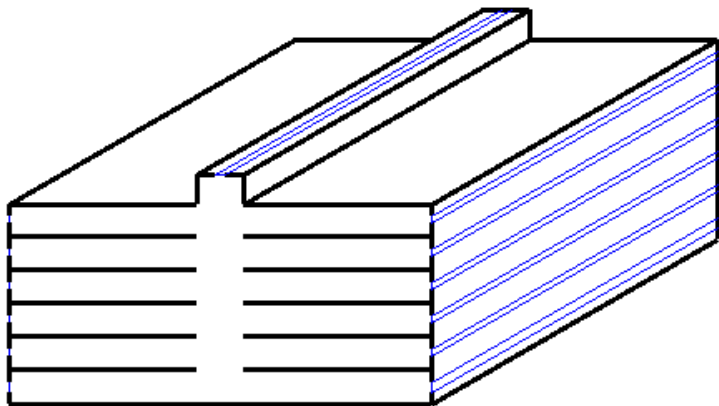
# **ENVIRONMENTAL SYSTEMS I**

## ASSIGNMENT 08: Natural Ventilation-Meyerson Hall

Ting Su

# OPTION 1-CENTRAL ATRIUM

General description  
In September Philadelphia, wind is mainly from south west direction, wind speed together with temperature become relatively high in noon time.  
Put a central atrium in the middle of the building help natural wind go through the building and carry out the heat from the central atrium.



Building dimensions

Help: ?

Number of floors: 6

Floor length: 35 m

Floor (bay) width: 20 m

Floor-to-floor height: 3.5 m

Floor-to-ceiling height: 3 m

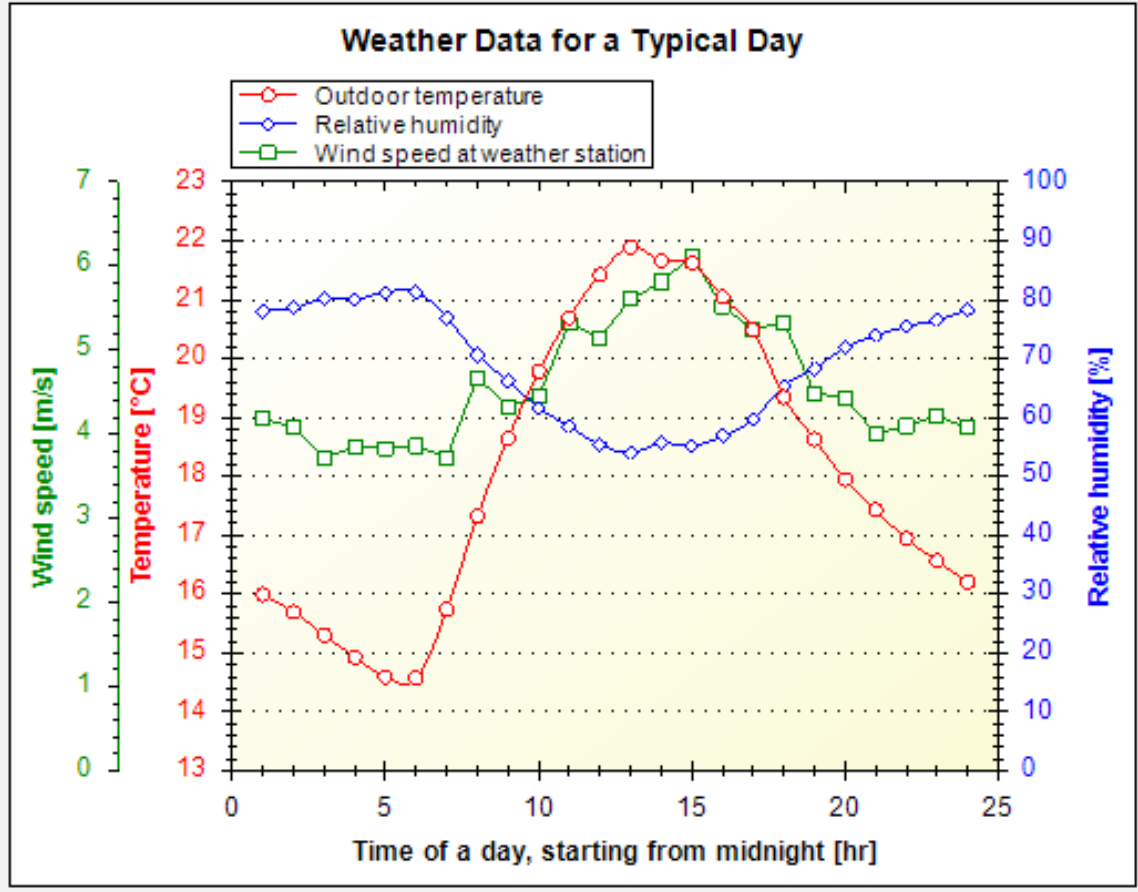
Chimney width: 5 m

Chimney height: 3 m

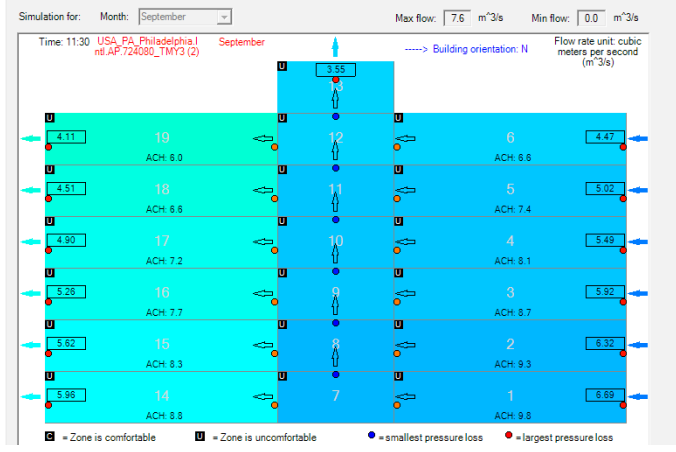
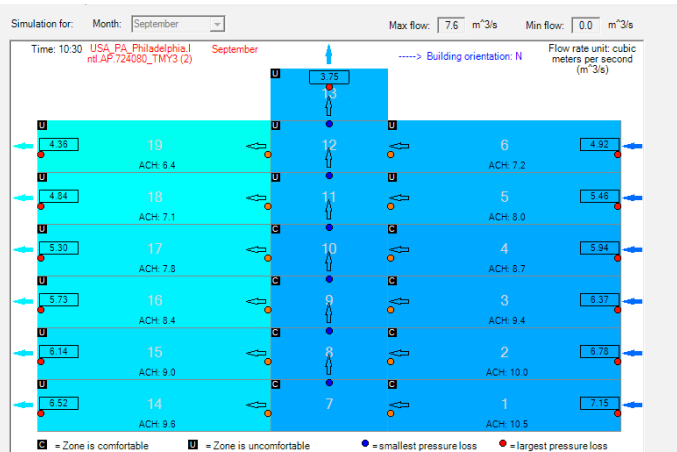
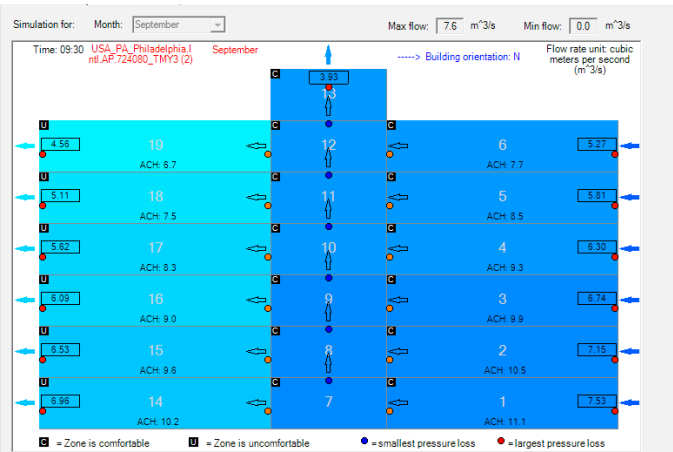
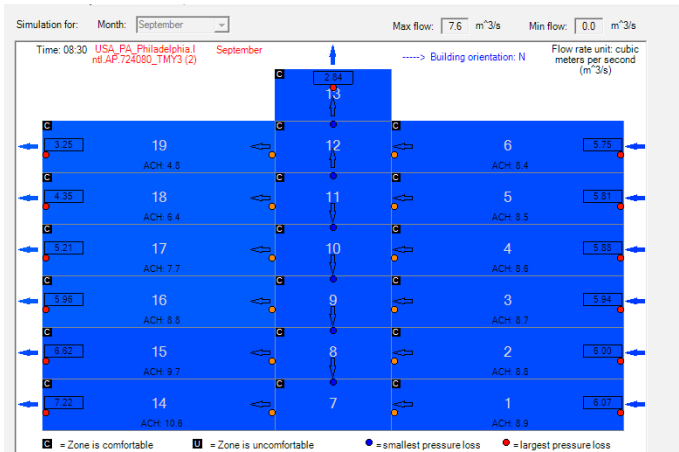
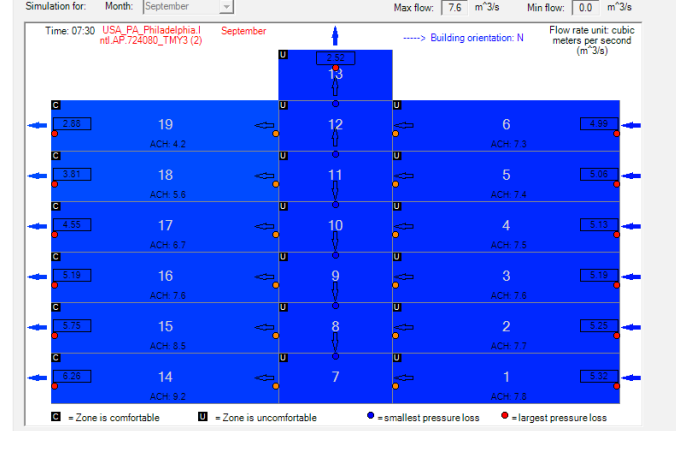
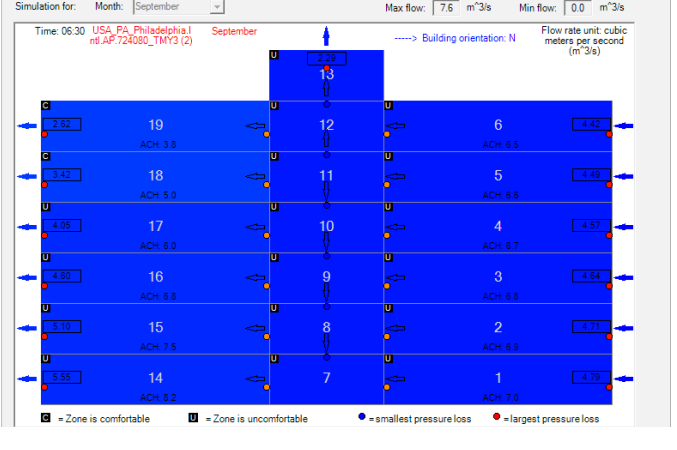
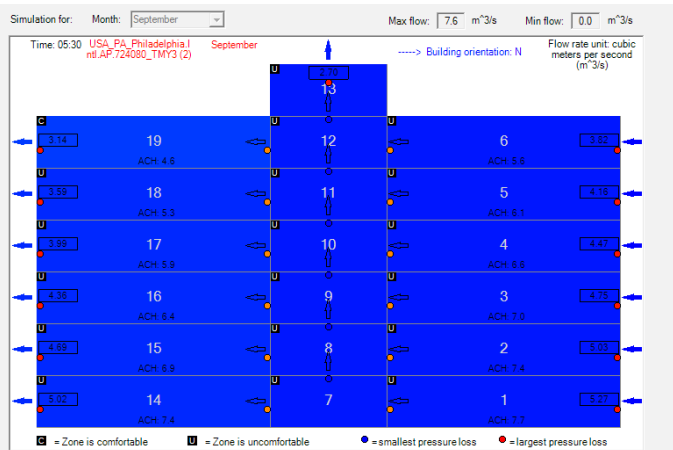
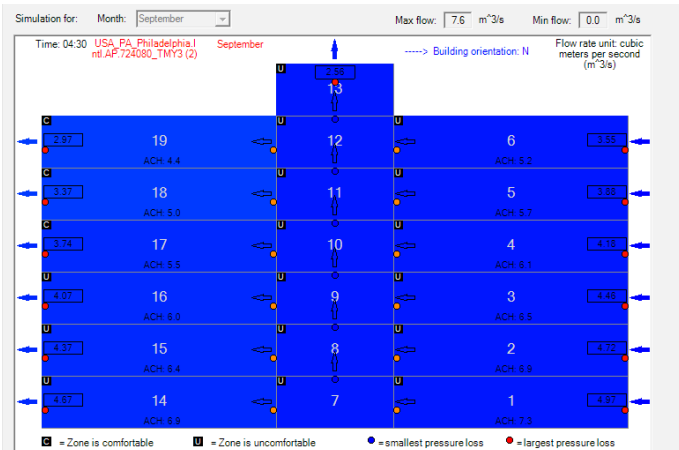
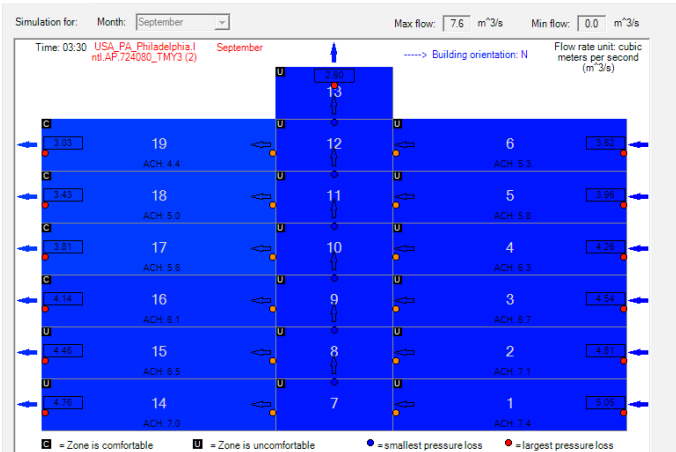
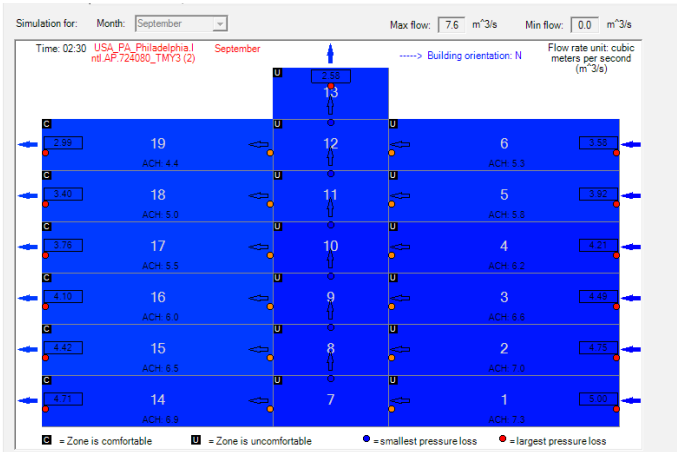
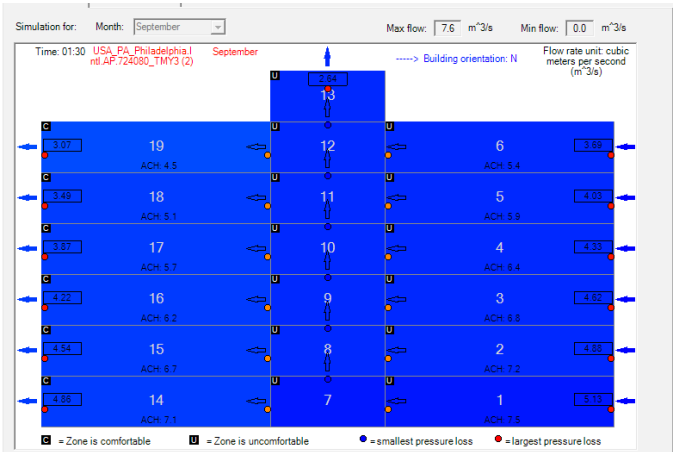
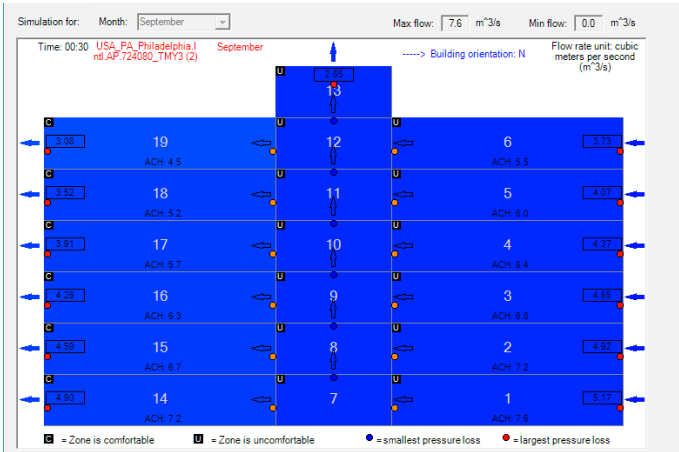
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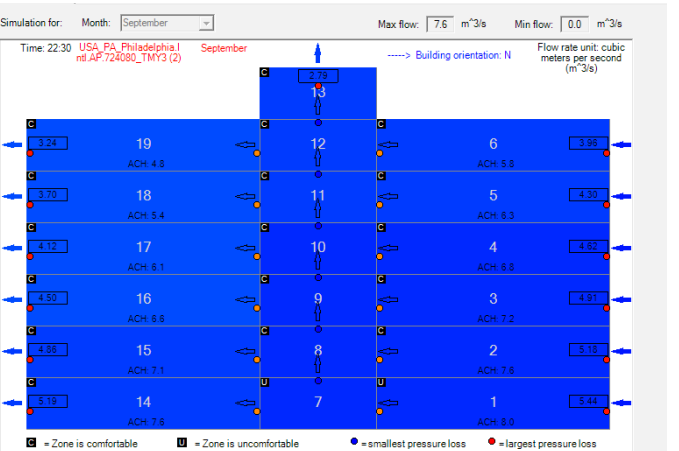
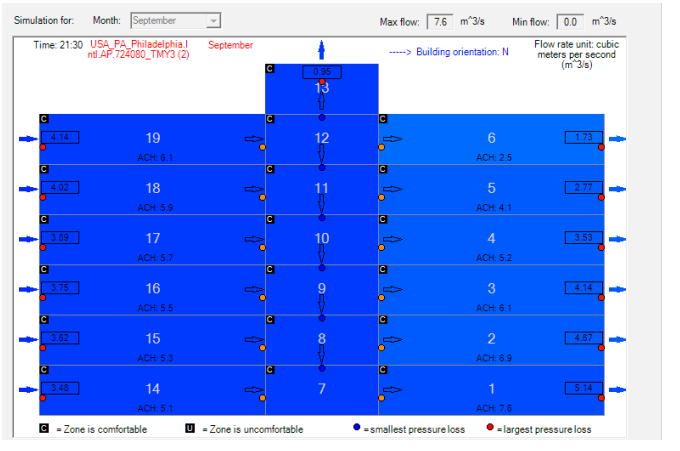
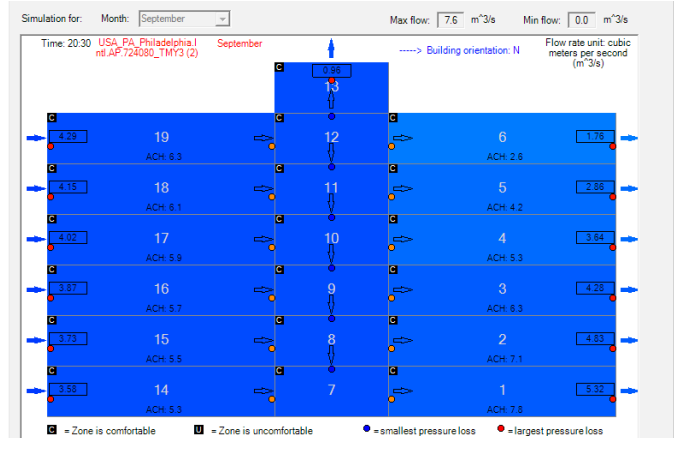
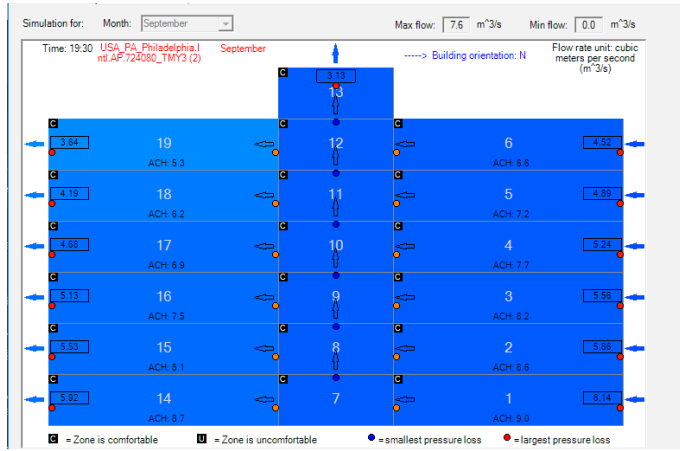
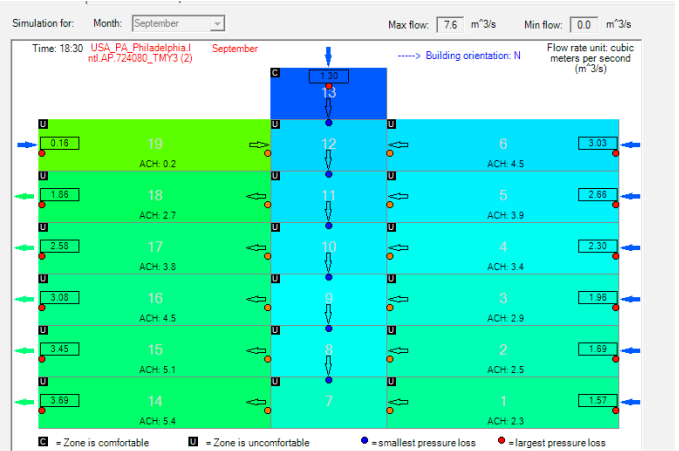
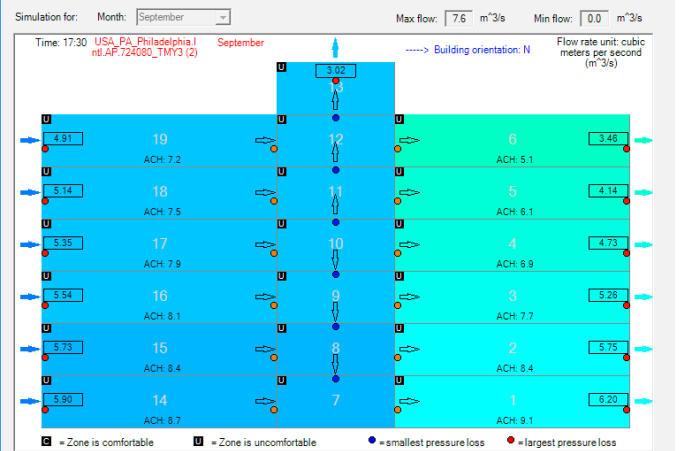
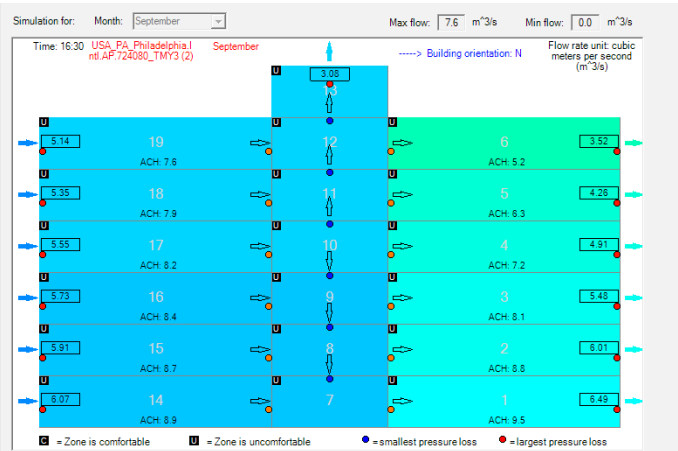
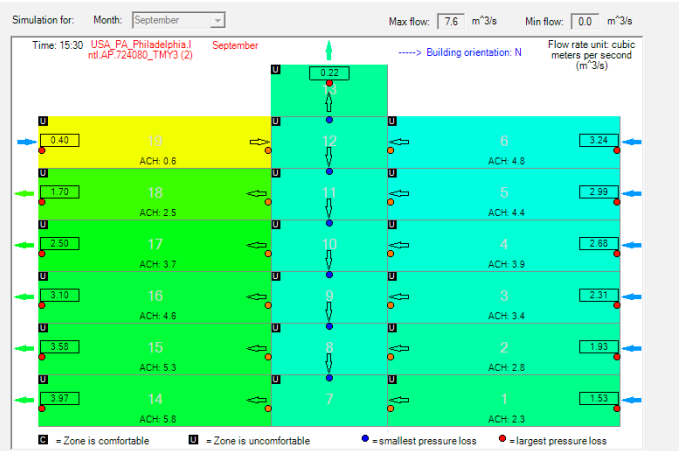
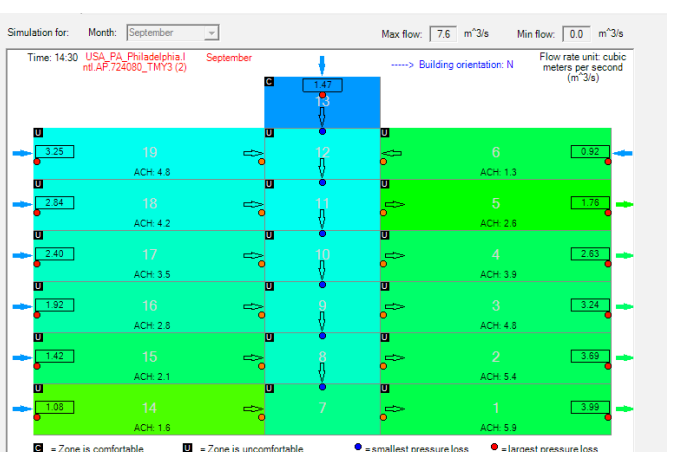
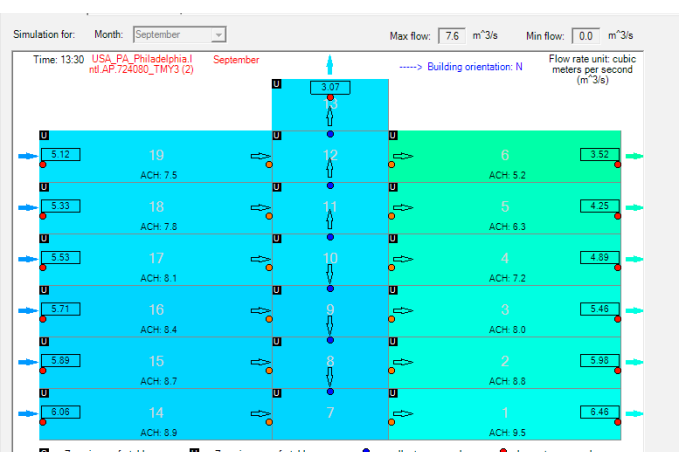
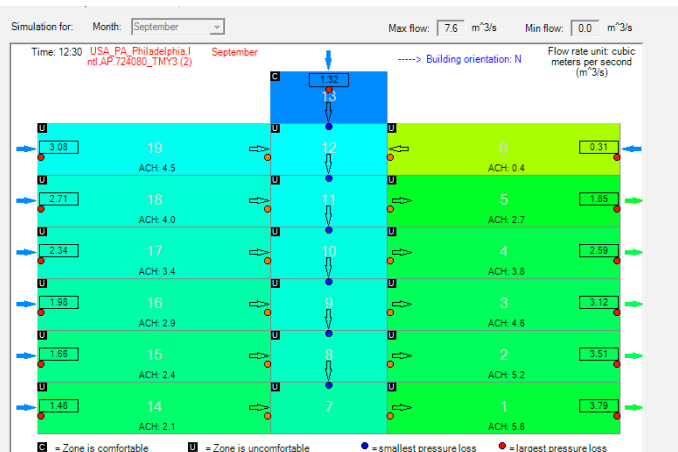
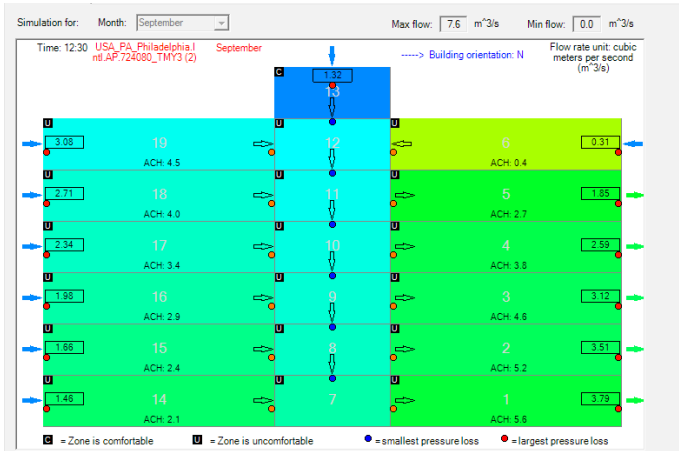
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# TEMPERATURE & AIRFLOW RESULT/hr

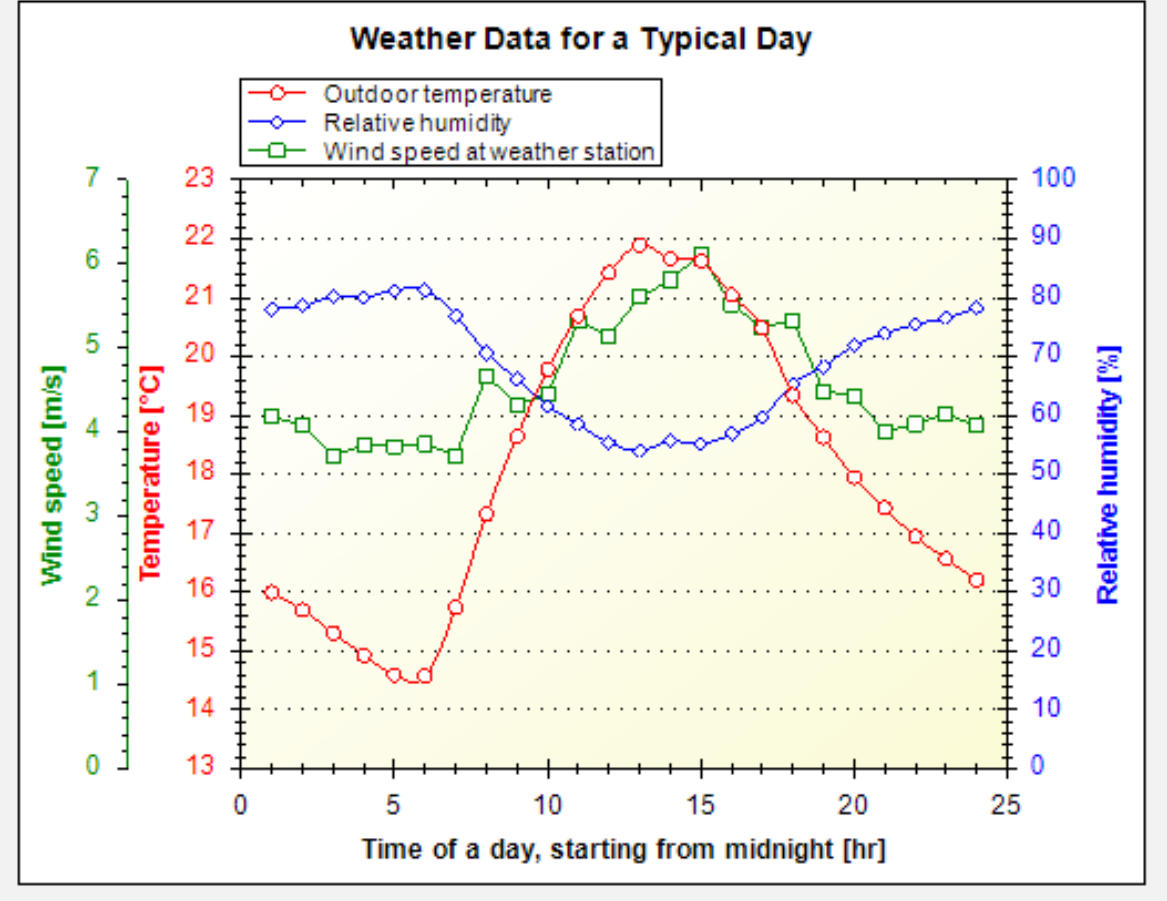
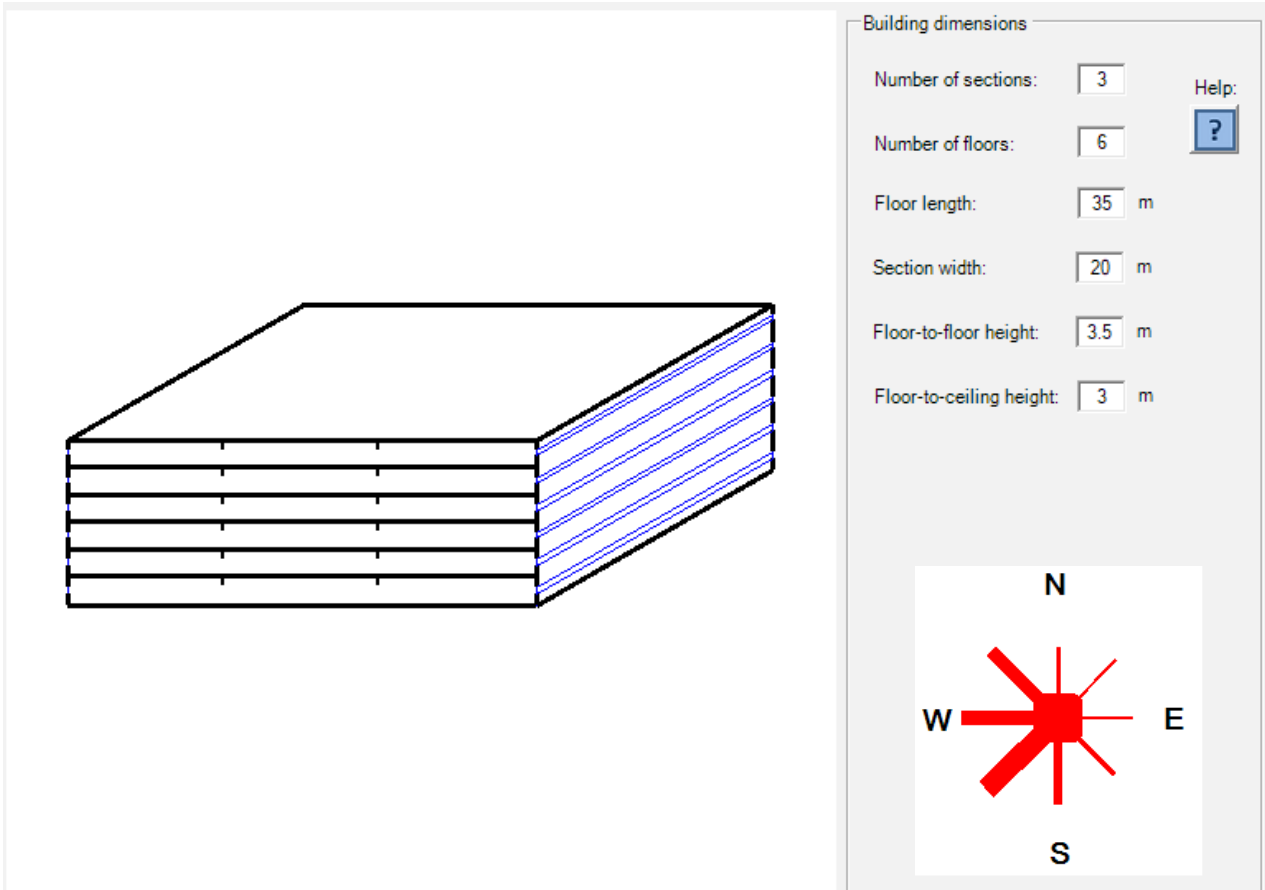


# TEMPERATURE & AIRFLOW RESULT/hr

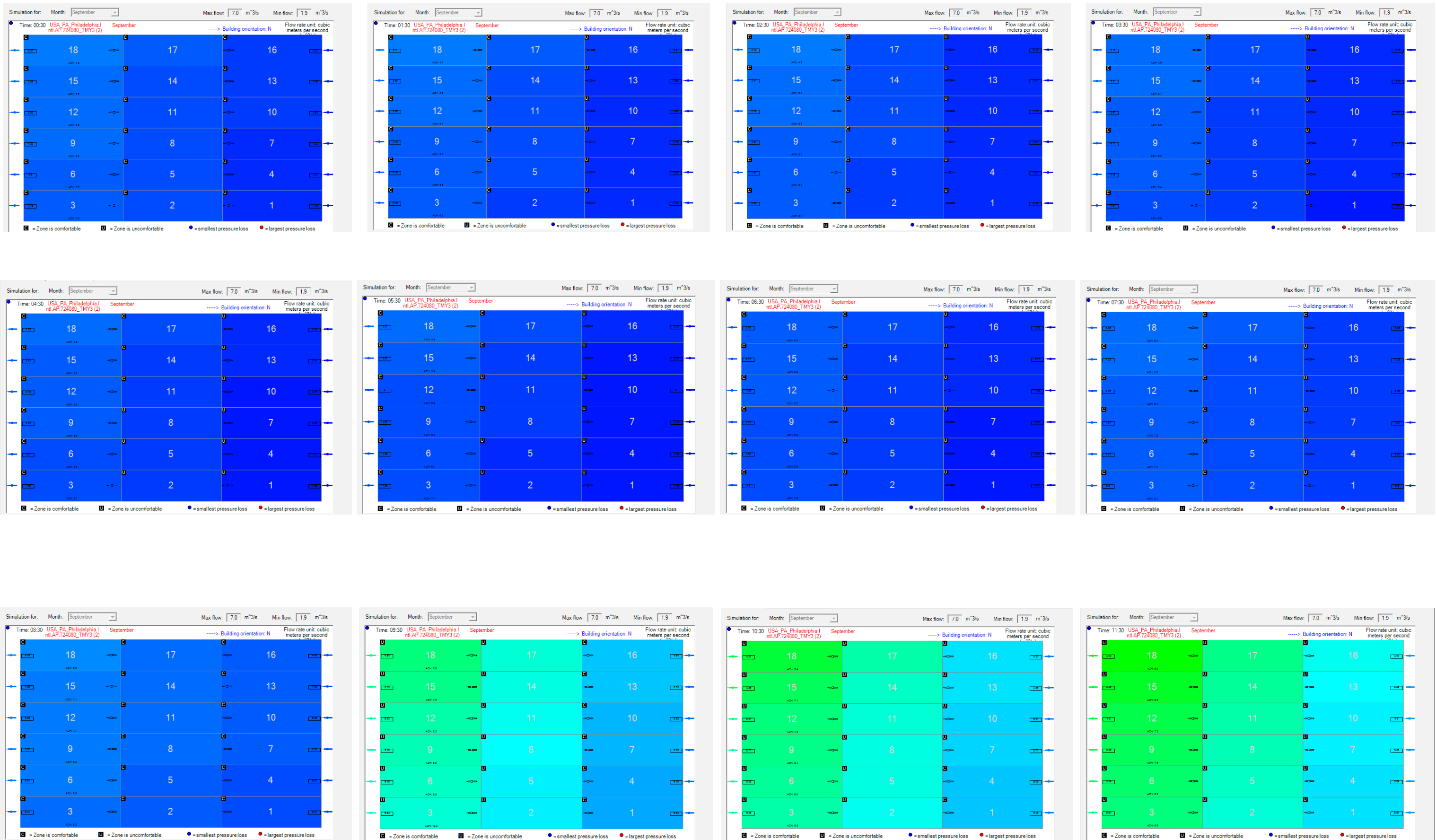


# OPTION 2-CROSS VENTILATION

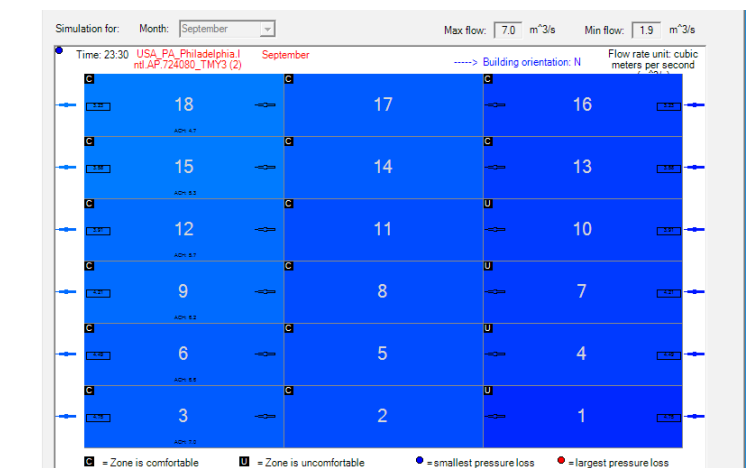
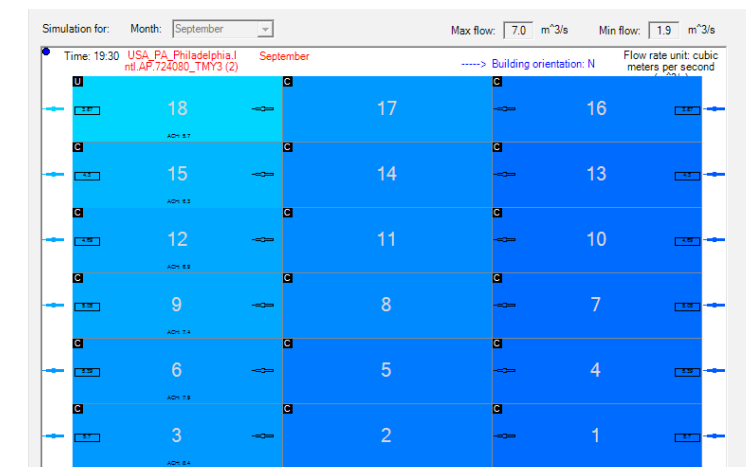
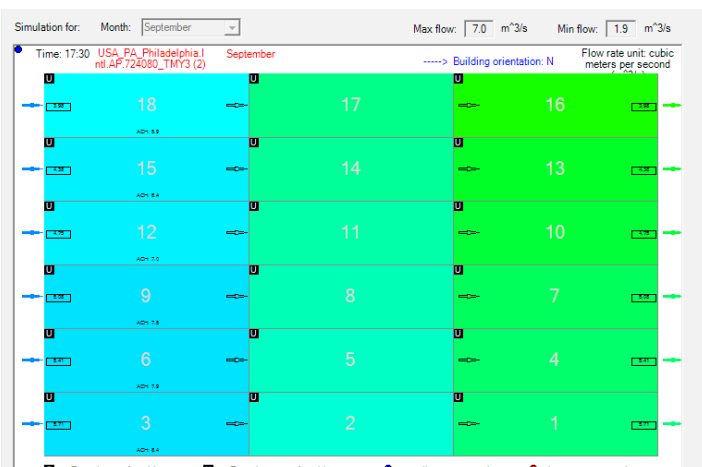
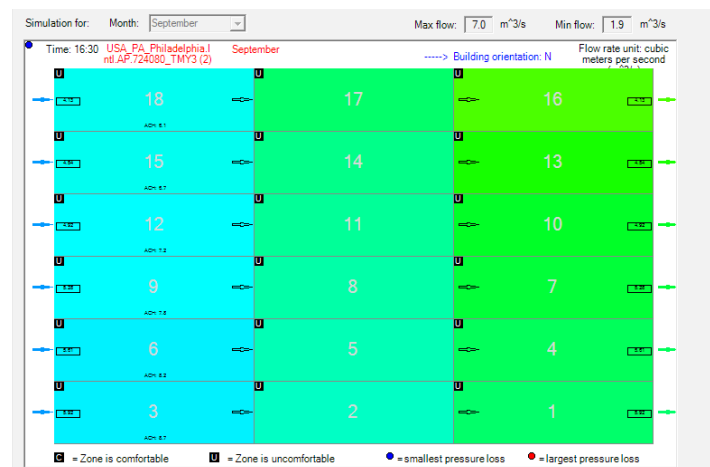
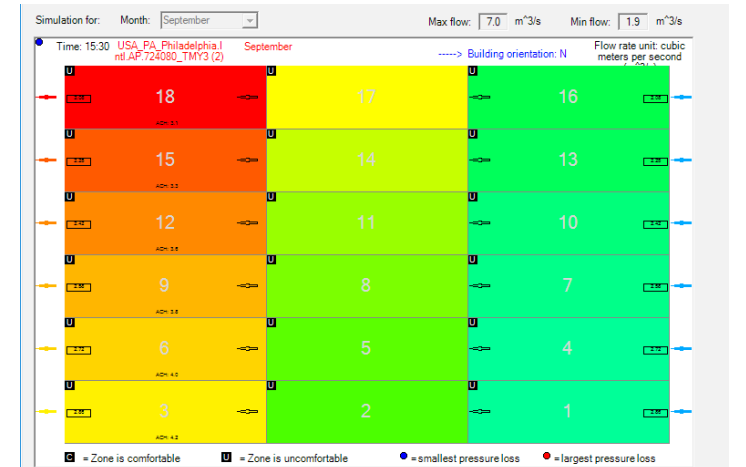
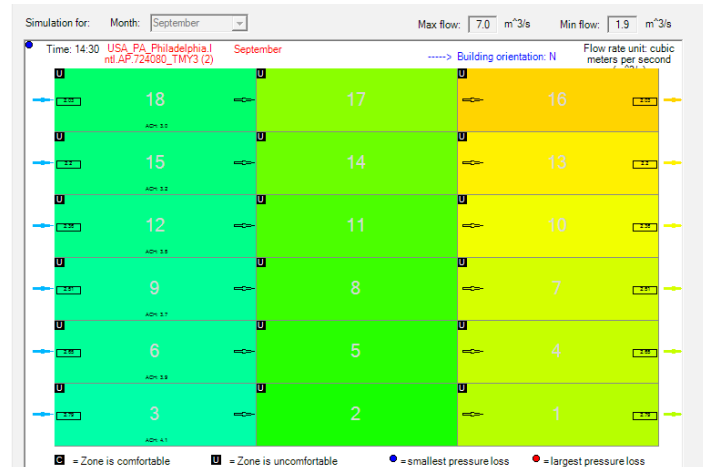
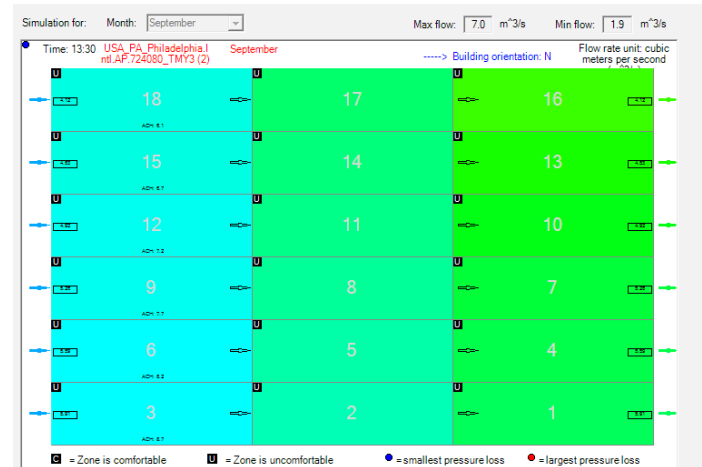
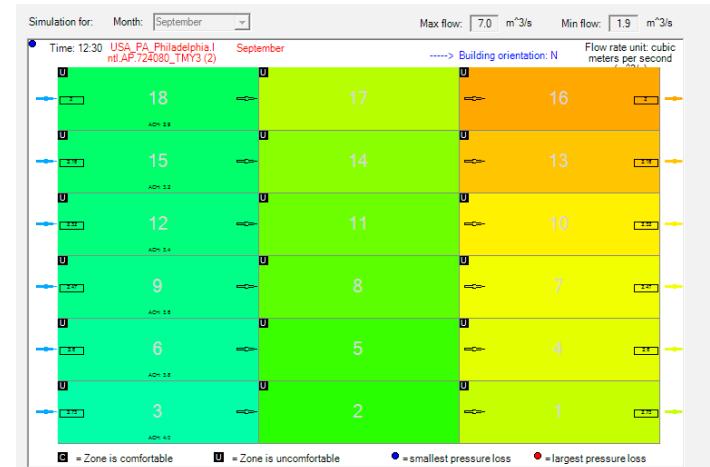
General description  
In September Philadelphia, wind are mainly from south west direction, wind speed together with tempreture become relatively high in noon time.  
Cross ventilation enhance the airflow by allowing wind pass through the whole building. It's a effective passive ventilation method and can bring ventilation to each corner of the building.



# TEMPRETURE & AIRFLOW RESULT/hr

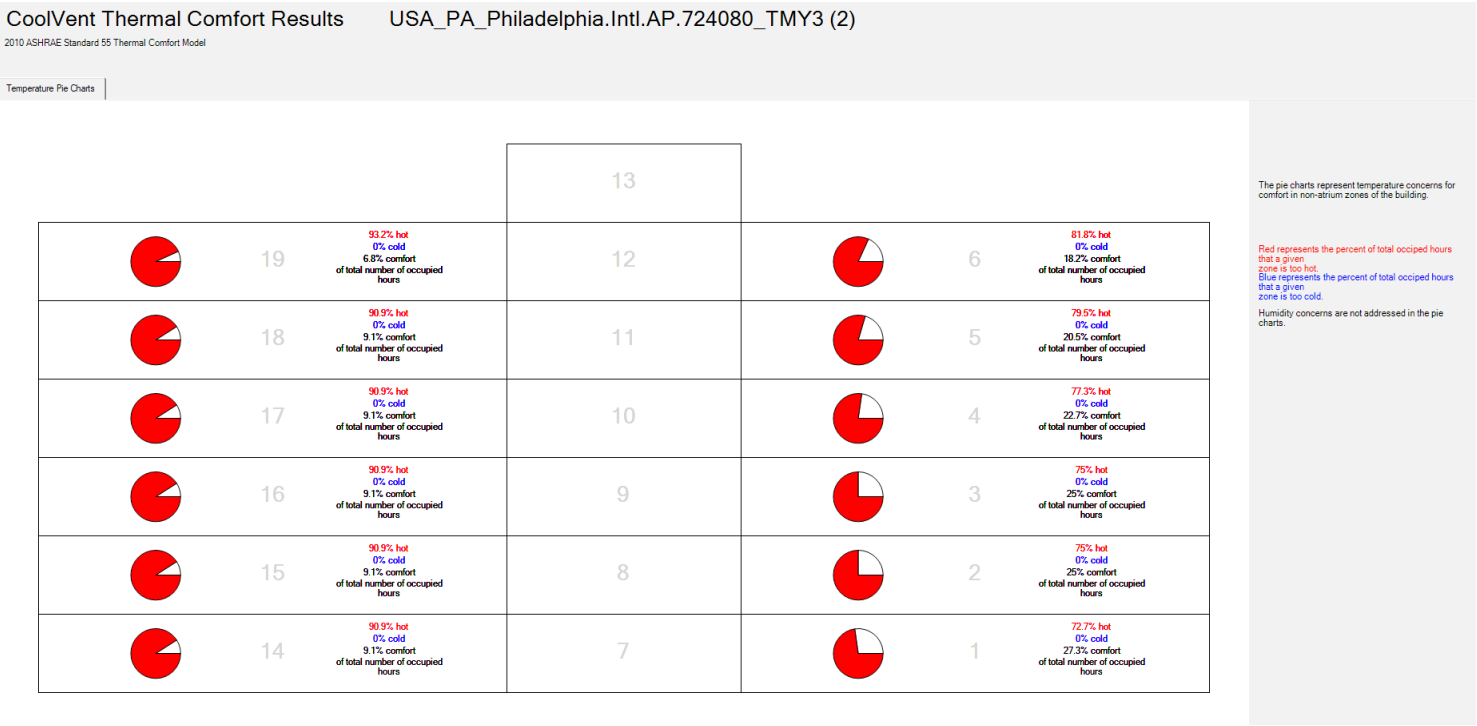


## TEMPRETURE & AIRFLOW RESULT/hr





# COMPARE AND COMPARISON



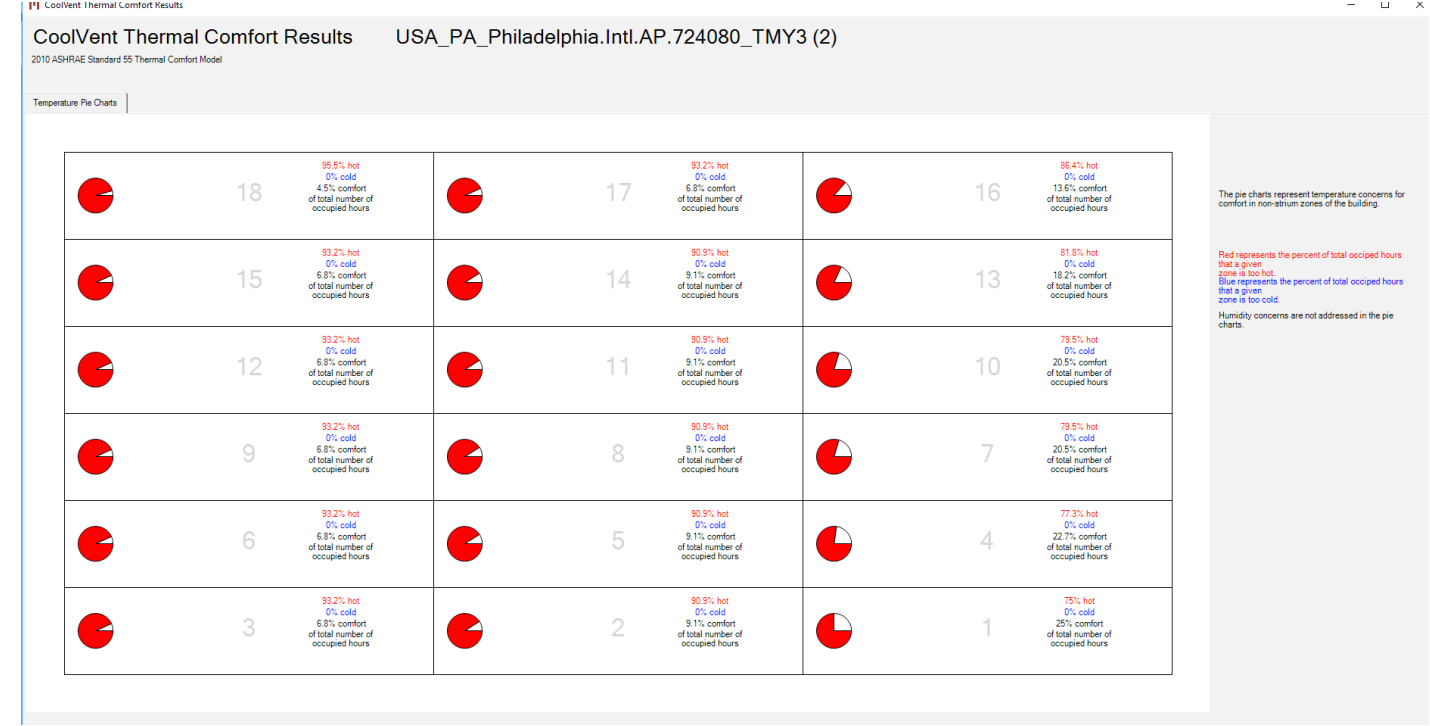
## SIMILARITIES

Both of the two ventilation methods have more exceed hot thermal hours is because the time of the study is in September, the indoor temperature is relatively high without HVAC.

The higher floor has more exceed hot hours than lower floor. By using airflow, heat move vertically, the higher the level is, the more heat it will gain.

## DIFFERENCES

Comparing the same zones in these two ventilation methods. The central atrium’s comfort hours is better than cross ventilation.



## CONCLUSION

Cross ventilation is a better choice for Meyerson Hall  
Central atrium performs better then cross ventilation, central atrium has a void space in the mid-  
dle of the building while cross ventilation still has those spaces. Thus, these two kinds of ventilation  
have almost same performance but, cross ventilation building’s square footage is larger than central  
atrium, thus, from my point of view, cross ventilation is a better choice.