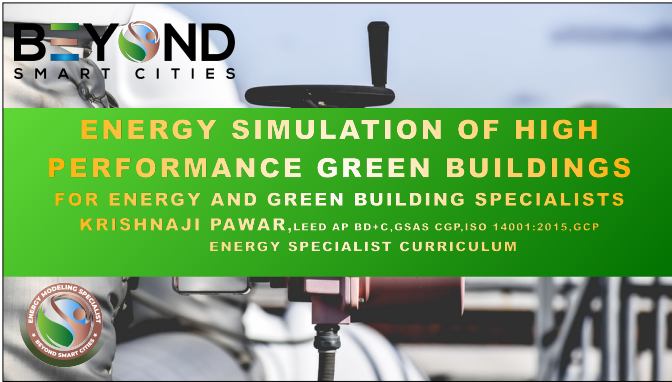
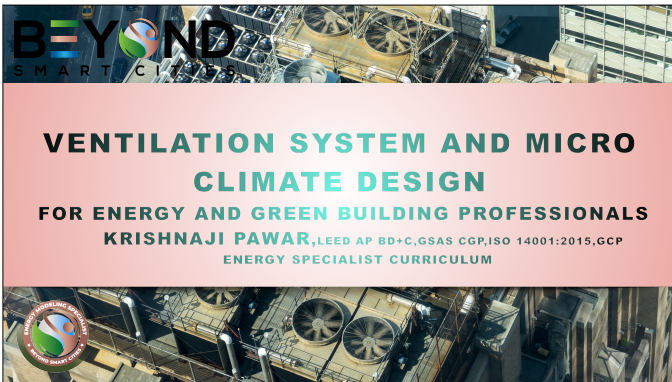
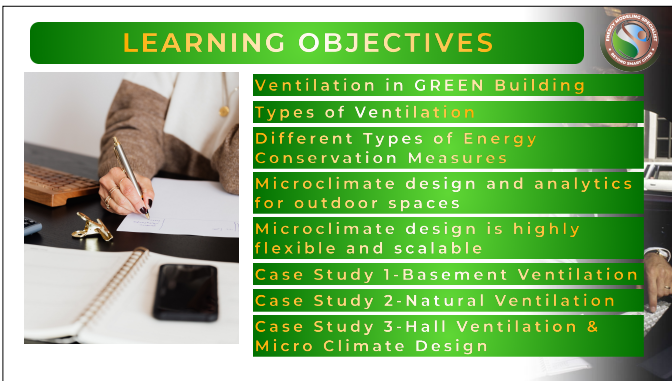








VENTILATION IN GREEN BUILDING

Ventilation is the method to improve the indoor air quality by removing indoor polluted air by fresh air. This is to capture idea to remove and dilute pollutants emitted in the living space to make them up to a desired and acceptable indoor air quality level. Sometime the materials used in a building are more important polluters than the habitant and contribute significantly role to degrade the indoor air.

The natural ventilation should also be considered while predicting building energy demand, because it is the responsible for the confortnace and ease in the internal building temperature and these all were achieve by some mechanical way too.



TYPE OF VENTILATION

- A. NATURAL VENTILATION
- B. MECHANICAL VENTILATION
- C. HYBRID VENTILATION

According to my study and research concern to my work has investigated in terms of significant measures for used of a axial flow fan for ventilation in a basement of a commercial building.

For a comfort living in a building ventilation plays an important role in today's infrastructure projects as ventilation is responsible for the exhaustion of the polluted and hot air and inflow of the fresh air.



TYPE OF VENTILATION +

A good ventilation in a residential or commercial building will depends upon the emission of the hot or polluted gases through the habitant and due to other causes were totally replaced by the ventilated equipment which maintained the indoor air quality. The total ventilation rate were determined and maintained by exhaust ventilators.

The selection of ventilation machine were depends upon the total CFM of a building required and the static required for it. In this project the how the ventilation is done in a commercial building is taken and the selection of the ventilated fan is taken is studied.



MICRO CLIMATE DESIGN

Microclimate consultants perform advanced microclimate modeling and leverage the resulting insights to develop comfort-enhancing solutions that work in harmony with a project's overall design vision. The benefits of microclimate design are best unlocked when consultants are involved in the very early stages of design and the insights derived from the analyses and multidisciplinary thinking can be used to inform fundamental design decisions. However, the same approach is also valuable in mitigating climate-related issues that arise at later stages or to enhance the comfort of existing outdoor spaces.

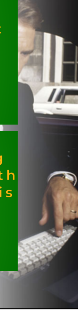
Microclimate design seeks to optimize the performance of both buildings and outdoor spaces in a variety of ways. For example, by analyzing the expected uses (time of day, tasks) of assets and the range of possible users (commuters, clients, employees) in conjunction with local climate conditions, the design team can ensure that projects are planned in a manner that maximizes benefit to users and makes the best use of valuable real estate.



MICRO CLIMATE DESIGN

In areas prone to extreme weather, like heat waves, cold snaps, and periods of heavy rainfall, microclimate consultants can identify and deploy design solutions that improve the resilience, functionality, and safety of outdoor amenities without detracting from their overall look and feel. This is accomplished with the help of a variety of strategies, ranging from the optimization of building massing to the use of vegetation and canopies.

For example, businesses and restaurants in the northeast of the United States seeking to extend the use of existing outdoor spaces through the colder months could work with microclimate consultants to improve thermal comfort. This could be achieved by integrating new landscaping elements or screens to block the wind while optimizing solar exposure and adding comfort-promoting design elements such as heated furniture.



MICROCLIMATE DESIGN IS HIGHLY FLEXIBLE AND SCALABLE

Microclimate design can be used to help cities tackle many of their most pressing challenges, from small standalone projects to larger-scale improvements in the urban realm. In addition to working with business owners to design or upgrade their outdoor spaces, microclimate consultants can partner with municipal planners to help improve the comfort and safety of multimodal networks as demand for them grows. Microclimate consultants can evaluate the pedestrian and cyclist experience at individual intersections or within entire neighborhoods, identifying uncomfortable or unsafe conditions resulting from strong winds near the ground or intense solar glare.

The insights they provide can aid decision makers in determining how best to streamline circulation & mobility — pinpointing the best routes for pedestrian paths, recommending mitigation measures to limit uncomfortable wind conditions, and identifying appropriate locations for covered rest areas.



VENTILATION SYSTEM AND MICRO CLIMATE DESIGN

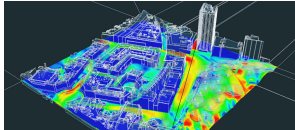
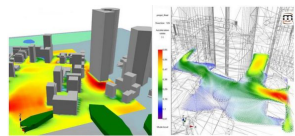


Computational Fluid Dynamics CFD in Building Air Flow Simulation

- Conservation of mass $\uparrow$
- Conservation of linear momentum $\uparrow$
- Conservation of energy
- Equation of state
- Initial and boundary conditions

CFD Approach in Building

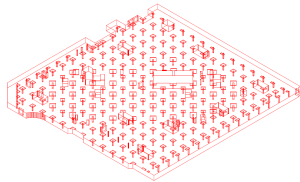
- Assembling the governing equations
- Identifying flow domain and boundary conditions
- Geometrical discretization of flow domain
- Discretization of the governing equations
- Incorporation of boundary conditions
- Solution of resulting algebraic equations
- Post-solution analysis and reformulation, if needed



CASE STUDY 1 - BASEMENT VENTILATION



- ✓ Avoid Short Circuiting of Air
- ✓ Maintain Comfortable air velocity
- ✓ Check for Age of Air in the premises.
- ✓ Trace the path of smoke in case of fire
- ✓ Equipment sizing for controlled micro climate
- ✓ Transient Simulation for Pollutant Dispersion
- ✓ Fire Spread analysis for refuge area identification

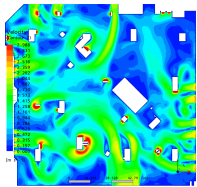


RESULTS



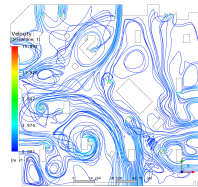
Velocity Thematic

1. Dead air spot identified
2. Age of air has been calculated
3. Static pressure requirement has been obtained



Stream Lines

1. Path of Smoke has been obtained
2. Placement of air moving device like jet fans identified

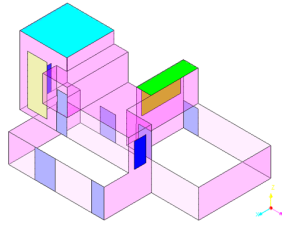


CASE STUDY 2 - NATURAL VENTILATION



GOAL:

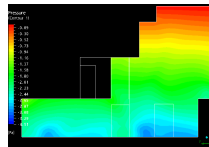
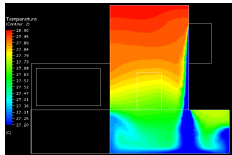
- ✓To find the right strategy to use the atriums for ventilation
- ✓To work out the natural ventilation rate in average weather
- ✓To study the effect of heat load on ventilation
- ✓To study the cooling wall convectors and their operation



RESULTS



1. The house would remain at negative pressure as soon as outside warm air finds a large way into the house from door and windows.
2. About 1 Pa pressure differential is achieved through this passive strategy.
3. It is recommended that this strategy is to be used when outside environment is pleasant and no internal cooling or heating arrangement is working.
- 4.5 to 10 m³ of air flow, 0.5 ACH



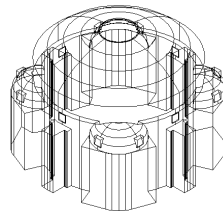
1. The above concept of cold breeze falling on the common areas is better visible in the temperature contour.
2. It also shows that the bar, stair and rest of the common areas are well cooled. This is only achieved by closing the small atrium which is internally suppressing the buoyant warm air movement from that atrium.

CASE STUDY 3 - HALL VENTILATION & MICRO CLIMATE DESIGN

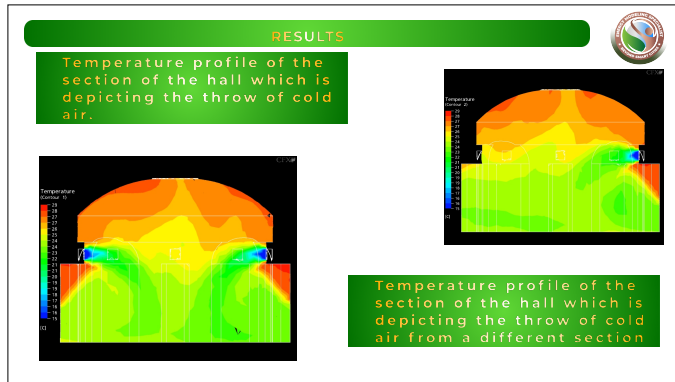


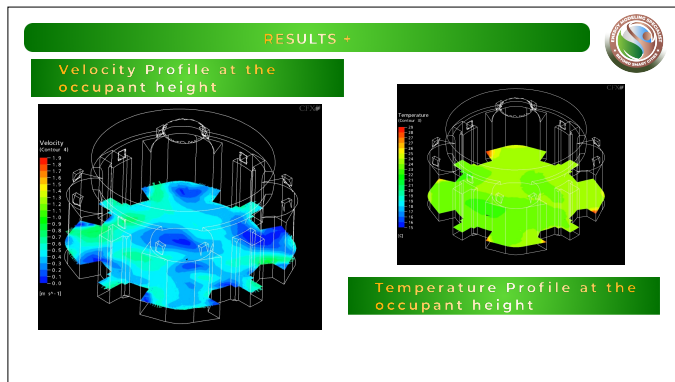
GOAL:

- ✓To preserve its monumental status a hidden air conditioning system has to be installed.
- ✓Required grill velocities to be determined to make sure that the throw of air is not felt.
- ✓To maintain the temperature of 23°C at the occupant height.
- ✓Strategy need to be worked out to use the nine existing stone grill and the top atrium hole.
- ✓Air flow rate required need to be calculated for 600 occupants. And temperature of treated fresh air need to be determined.



Total Volume= 7530 m³





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SMART CITIES

THANK YOU

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MARKETPLACE
