

ARCH 4150/5550 • Whole Building Analysis

Envisioning the Sustainable Campus

towards zero: integrating carbon, energy, water and ecological impacts

Exercise 4: Design recommendations based on Shoebox Analysis evaluation and presentation of results

Exercise 3 Due Date

Thurs. Nov. 10, 2011, 4:00 PM

Upload to Exercise 4 assignment drop box on course Moodle site

Phase Grade weighting: 10% total grade (100 points); team grade

OBJECTIVES

- To learn to understand and evaluate simulation results from your daylighting and thermal analysis
- To learn to inform design choices based on evaluation of your analysis
- To formulate a cohesive integrated design strategy based on your findings and conclusions
- To effectively communicate design recommendations and decisions through graphical presentation

Introduction

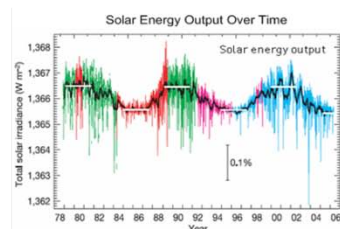
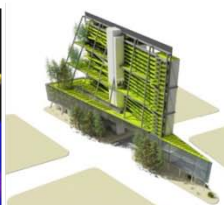
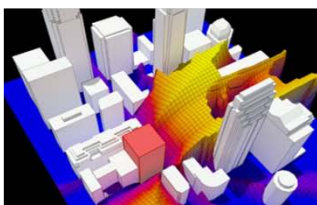
For this exercise you will complete the analysis of your “shoebox” model, by applying various energy conserving strategies to your IES VE model, running simulations and documenting, comparing and interpreting the results. The subsequent evaluation of the results from these and all of your previous analyses will be used to inform design decisions that will later be applied to your detailed design model. E.g., you will establish optimal envelope insulation values and glazing types, window and skylight-to floor area ratios, placement of windows, etc. You will also make preliminary decisions on whether to include light shelves, shading devices, passive solar and daylighting strategies. You will be asked to create written narrative of the results of your analysis up to this point and the findings and conclusions that you will use as you move into the next phase of design and whole building analysis. You will be asked to present your findings and design recommendations as part of a larger group presentation for your project type.

You will be asked to work as a team in completion of this assignment. Your team consists of all the individuals working on the same project for this class. As there are three projects, there are three teams. Each team will select from among themselves a project manager who will create a workplan containing the task assignments for the group. The final deliverable is a powerpoint slide presentation that contains the following information:

Presentation Contents:

1. Project Overview and Background Information
2. Methodology Used
3. Summary of Findings and Conclusions
4. Recommendations and Next Steps
5. Q & A and Comments

The presentation will be made to the prospective “client” representative and other expert guests on Thursday November, 10, 2011 at 12:45pm in Room 71. Each team will have 20 Minutes for their presentation including questions and comments from the “client” representatives and guests. Please allow at least 5 minutes for questions.



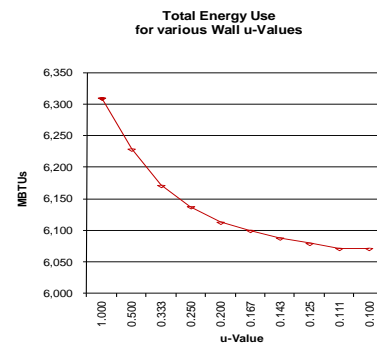
Exercise Four: Design recommendations based on Shoebox Analysis evaluation and presentation of results

STEP 1: Together with your teammates, you should review all completed analysis and plan any other design conditions you wish to analyze using your models. Do the following:

- a) Determine the strengths, abilities and specialties of your teammates and decide on task assignments for completion of the analysis, creation of output charts and graphics that show the design conditions modeled as well as the results. Don't worry if you are not sure about all of the things you want to analyze, just get something down in writing so you can begin to prioritize and make assignments within your team.
- b) After the individual analysis work has been completed, the team should review the analysis results, formulate conclusions and decide on the best recommended design strategies based on your findings and conclusions.
- c) Determine the best methods, graphics and presentation format to convey your findings and conclusions. Make any further assignments necessary to complete presentation graphics.

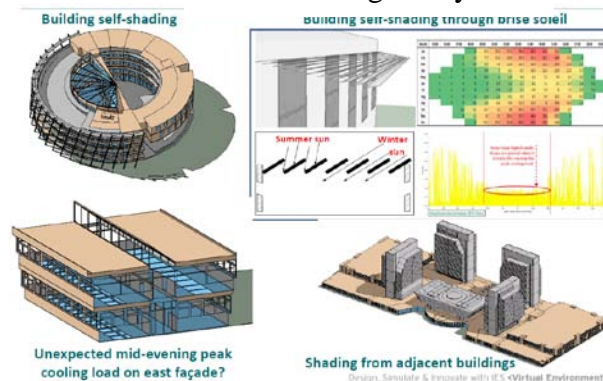
STEP 2: Develop presentation slides. Do the following:

- a) Based on the strengths, abilities and specialties of your teammates make task assignments for preparation of all necessary presentation slides (see presentation contents on page 1.) Plan to have no more than 15-20 slides.
- b) Provide the following information:
 - i. Project overview and background: include building type, use, floor area, number of building occupants modeled, hours of operation and baseline data including source of baseline energy usage. Review major objectives and design challenges.
 - ii. Analysis methods: include a detailed list of the analysis tools used and types of analysis performed. Be specific, e.g., Thermal simulations included creation of a shoebox model corresponding to the actual project type, area, volume, orientation and fenestration configuration using Sketchup Pro version 8.0 with the IES VE Plugin, then export to IES VE Pro, Solar shading analysis using SunCast tool and dynamic year round simulation using the Apache tool in the IES VE Suite. Also state specific types of daylighting studies and tools used, e.g. illuminance daylight factor study using FlucsDL tool in IES VE Suite. You do not need to verbally state all this information, but it should be provided in your slides in written format. Include a verbal description of the basic processes you followed.



- iii. Summary of Findings and Conclusions: Show the most important results from your combined analysis work, when possible the individual who performed the analysis should review it but you can also elect to have a spokesman for the various

Solar Shading Analysis

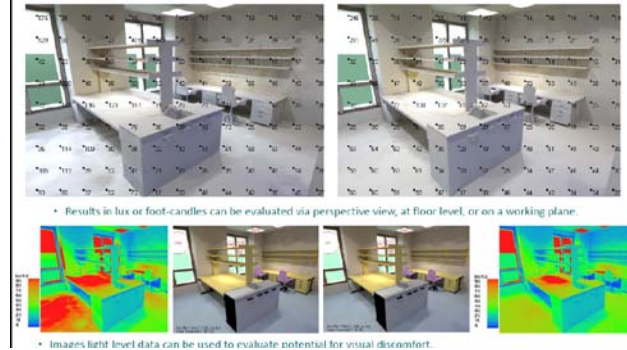


sub teams. Be sure to be brief and to the point using your graphical charts and drawings to “speak” for you. For each analysis, state the key conclusions that were reached including the overall savings in energy (MBtu or KWh or other metric) from the baseline, and also the percent of total energy use reduction resulting from that strategy.

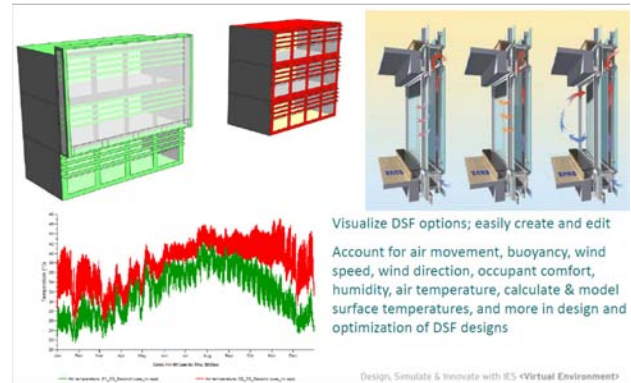
- iv. Recommendations and Next Steps: Based on your findings and conclusions enumerate your recommended actions, design recommendations and include a combined total of the energy savings from all of your recommended strategies. State any further research that should be done and other analysis work that you would like to do going forward. State any problems encountered in the analysis that may affect the accuracy of your findings and any other caveats such as unpredictability of weather, assumptions made, etc.

- c) Assemble your slides and review them as a team. Critique the presentation, determine where there are gaps, inconsistencies or information that is unclear. Decide on desired revisions and who will execute them. Be sure to add graphics that are needed to illustrate the conditions modeled, the results obtained and your findings and conclusions.
- d) Set a date for a rehearsal.
- e) Rehearse your presentation and make sure that the entire presentation can be made in 15 minutes or less. Fine tune any speaking and presenting assignments.

Radiance Glare Studies



Double Skin Facades



STEP 3: Deliverables: Make final adjustments to your presentation. After giving your presentation upload your presentation file(s) to the **Exercise 4 Drop Box** on the course Moodle Website by Thurs. Nov. 10 at 4pm.

GRADING CRITERIA - Exercise 4: 100 possible points (10% total of grade) based on the following criteria:

- Completeness of deliverables submitted
- Depth of analysis and complexity of project and reasonableness of conclusions
- Clarity and accuracy of quantitative analysis charts and graphics
- Quality and craft of presentation - both verbal and graphical content