“The pragmatic architect is the one who above all makes conventions speak, (s)he who salvages a poetic dimension from the here and now, who is capable of decontextualizing the already known and giving the luster of poetry. An insistence on the material aspects, constructional as well as those referring to manipulation of territory, ought to be interpreted from this angle: it is not by abandoning the more routine aspects of the discipline that we can transcend it, but by recognizing in these aspects the whole poetic force of a founding act.”

-Inaki Abalos

“Derive [your] critical edge from an assumption of architecture’s basic adequacy and an ease with the controversial proposition that architecture has no other more profound project than to fabricate a new sensibility from its own palette.”

-Jeffrey Kipnis
Course Description:

This lecture course is integrated with the co-requisite Comp Studio. The studio and lecture together merge several areas of your education in the elaborated design of a building. In the lecture/studio, you will develop the design by specifying and articulating the many systems that comprise architecture: site systems, energy systems, material systems, construction systems, structural systems, formal ordering systems, spatial systems, codes, plumbing, circulation systems, programmatic systems, event systems, urban systems, climatic systems, ventilation, daylighting, program, etc. Architecture is comprised by these various systems. However—make no mistake—these systems themselves are not architecture! These systems left unto themselves may only at best yield a building. However, here we are concerned only with architecture. The aim is to neither be dominated by any system, theory, technology, compositional strategy, history, computer program, building or energy code, nor to dismiss any of these but rather to become secure enough in their depth and breadth to swerve them for your own ends in your own work. An isolated pursuit of any one or few of these, or the neglect of any of these, will paralyze or exhaust your work. The key to this semester is how you will understand all these systems and their conventions well enough to make the ‘speak,’ in other words, how you will elevate the systemic nature of contemporary practice to the status of architecture.

The title clearly indicates the content of the lecture course. Working backwards:

Systems: The course and studio are preoccupied with the systemic nature of contemporary buildings. Today, the architect is foremost a specifier and organizer of manifold systems: material, energetic, spatial, urban, ecological, climatic, circulatory, structural, programmatic, codes etc. The lectures will extend this systemic discussion to larger concerns as well. For instance, the specification of any material has far-reaching effects that systematically extend beyond the building itself, altering distant ecologies and economies for example. The work of an architect, and architecture itself, is thoroughly systemized today. These systems are often dominated by conventions. That does not, however, preclude unconventional applications of those conventions. Our task is to learn not only the systems and their systemic effects, but to understand these systems well enough to make the systems and their conventions ‘speak’ architecturally. For example, Mies van der Rohe transformed the convention of the rolled steel I-beam into architecture. For Mies, the I-beam captured both the conventions of his period as well as captured an aesthetic system and a technical system. Numerous case studies will illustrate this task. Again, systems by themselves do not constitute architecture but architecture will not occur without systems. In other words, this course asks you not to think of systems, but rather to think systemically about building systems.

Building: Building is a decent noun, but it is better as a verb. In this class and studio, building is an active, ceaseless process: building ecologies, building economies, building buildings. Any and every building is a capture and channel device: actively exchanging energy with its milieu, constantly shaping occupancy, deteriorating as it weathered. The process of design itself should be understood in an active sense. In this studio and class, every drawing and model should literally rehearse the process of building. In this studio and class, the increasingly physical layers of construction should literally be drawn and built in models. Let there be no confusion, however: architects do not build. Architects in the end provide information in the form of abstract representations: drawings, specifications, and models. Thus their task and the task of this class is doubled: architects have to thoroughly understand the physical processes of construction while also clearly conceiving the immaterial consequences of design decisions. As such, there will be a significant emphasis on the clarity, content, and quality of your visual explanations of your architecture and its systems.
Integrated: The integration, coordination, and organization of systems is essential to contemporary construction. Architecture has few, if any theories of integration, so we will develop our own. The lectures will look at examples of well-integrated buildings and deduce principles of integration. Integrated practices include both spatial organization as well as the integration of various trades. Architecture is becoming increasingly complex both physically and organizationally. Beyond figuring and specifying building systems, architects must also clearly coordinate and organize the systems through a series of independent consultants. Thus, integration must be considered materially and immaterially. For instance, a formal ordering system may emerge from your understanding of the ordering system inherent in a particular construction system. Inversely, a construction system may emerge from your understanding of a formal ordering system. What matters is the degree to which the project integrates these multiple systems. Integrated Building Systems presupposes that you will have the ability to integrate, coordinate, and organize building systems in a clear manner. For us, this will involve discerning and visualizing the systems we propose in the studio projects. So again, there will be an overt focus on the representation of the systems as much as the project itself.

The integration of systems is one way to elevate systems beyond mere building to architecture. Integration is part of the surplus that separates architecture from mere building. Integration is the peculiar phenomenon that makes a whole greater than the sum of its parts. This is one task of architecture.

Course Structure

The typical diagram of design studios is a failed diagram for teaching Integrated Building Systems.
The combined studio and Integrated Building Systems lecture are coordinated and follow a different studio structure that depends on interaction with a studio partner, studio instructors, outside critics, and outside consultants.
The experience of this coordinated studio and lecture course sequence differs also in terms of credit structure.

Requirements
There are six requirements for this course:

1. attendance at all lectures (attendance will be taken) 10% (total)
2. quiz for each required reading 10% (total)
3. Review #1 (system presentation) 15%
4. Review #2 (mid term) 20%
5. Review #3 (design review) 20%
6. Review #4 (final review) 25%

Attendance
Attendance is mandatory at all lectures and attendance will be recorded. Two or more absences will affect your grade on a curve. More than three absences will constitute a full grade deduction. More than 5 absences will constitute an automatic failure. If you miss a lecture, email the instructor.

Laptops, etc.
There will be no laptops, ipads, phone calls, texting, or any other electronic devices in this class. The performance of students that use such devices during lectures is well studied and all signs point towards greater retention and higher performance when students are more directly, and thus cognitively, engaged with the lectures. Take good notes, ask good questions, and then check facebook, trade your stocks, buy a horse (or whatever else I have seen in class) outside of class.
<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
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<td>1</td>
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<td>14</td>
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<td>16</td>
<td>Monday May 9</td>
<td>NO CLASS: MEK DAY</td>
<td>NO CLASS: MEK DAY</td>
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</tr>
</tbody>
</table>
Reading Responses
For each of the required readings as noted in the schedule, submit a reading response. (there will also be quizzes on some readings)

1. Find the correct reading assigned for the next class period and its associated question (or prepare for a quiz on the material in the reading).
2. Read each reading at least twice before you begin your response.
3. **WRITE** a single, **high quality** response for each question concerning the reading. In all cases court brevity. The response should be short but thorough, capturing in a few words the **primary knowledge** of the reading’s question. It is very difficult to concisely and completely communicate the content of a coherent response in a few of good sentences. However, this type of writing is increasingly important in your discipline. So provide adequate time to write, review, edit, and revise your work at least a couple of times before you submit it. It is important that the writing is clear, direct, and that every word counts. What you leave out is often as important as what you include. This response is **NOT** a flaccid paragraph about your opinion of the reading. It is not written in the first person. The response should directly address the reading’s question. The questions connect the reading and lecture content to the studio project. As such, they should also stimulate thinking about the project.
4. **WRITE** any additional questions or comments you have about the reading or the course. Look up words you do not know.
5. **HAND IN** your one page assignment at the beginning of each lecture.
6. **NO LATE SUBMISSIONS: NO EXCEPTIONS, NO EXCUSES. NO EMAILED SUBMISSIONS WILL BE OPENED.**
7. **ONLY TYPED, PRINTED HARD COPIES ARE ACCEPTED.**

Grading Criteria
Your grade for IBS will be determined primarily by the technical merit of your studio project, as evident in key reviews. The following criteria will be used to evaluate your work:
- **Completeness**: completion of required work on the technical systems (as evident in the presentation requirements)
- **Visualization**: the ability to provide clear and rich visual explanations of technical systems and their operation
- **Integration**: the degree to which the various technical systems are integrated into the conceptual and physical development of the project
- **Craft**: the quality of execution exhibited in the required drawings, diagrams, and models. “Quality is a habit, not an act.”

Grading
In accordance with Northeastern Department of Art and Architecture grading policy, grades will be distributed according to the following scale:

A superb quality work. A- high quality work.

B+ good quality work. B above average work. B- average work. (Hence everyone starts here and moves from here based on your work)

C+ below average work. C well below average work. C- minimal work.

D+, D, D- marginally acceptable work.

For more detail refer to [http://www.architecture.neu.edu/student_resources/grading_policy/studio_course](http://www.architecture.neu.edu/student_resources/grading_policy/studio_course)

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For more detail refer to [http://www.osccr.neu.edu/policy.html](http://www.osccr.neu.edu/policy.html)
Grade Questions
Questions about grades will be only discussed in a meeting with the instructor. They will not be discussed via email as this is not the appropriate venue for this type of conversation. To meet with the instructor, stop by during office hours or schedule another appointment.

Questions about final grades follow the same process. If you feel you should have a grade different than that recorded, it is important that you make your case. To do so, prepare a document that contains your name, your partner’s name, your studio instructor’s name, the course number, the semester and year, and your recorded grade at the top of the page. Next, include documentation of your grades for all of your work and bring the original graded work to the meeting. This will help us ensure that there is not a disparity between the grades marked on the assignments and those recorded. Then, in quantitative terms, build an argument for why your grade should be different and for what grade it should be. In this text, you will need to additionally cite specific examples of your work that illustrate the points you make in your text. (Additionally, submit the work in question as illustrations in an appendix.) Finally, compare your work with that of a range of your peers, again citing specific evidence (not names but examples drawn from this range of work). This documentation is important for the instructor to understand your point of view and to document the process. To adequately document this information, you’ll need more than one page of text if not three or four pages in addition to the appendix.

Objectives and Outcomes
The Comprehensive Studio & Integrated Building Systems respond to the following NAAB Student Performance Criteria:

-Comprehensive Design
Ability to produce an architecture project informed by a comprehensive program, from schematic design through the detailed development of programmatic spaces, structural and environmental systems, life-safety provisions, wall sections, and building assemblies, as may be appropriate; and to assess the completed project with respect to the program’s design criteria.

-Building Systems Integration
Ability to assess, select, and integrate structural systems, environmental systems, life-safety systems, building envelope systems, and building service systems into building design

-Detailed Design Development
Ability to assess, select, configure, and detail as an integral part of the design appropriate combinations of building materials, components, and assemblies to satisfy the requirements of building programs

-Site Conditions.
Ability to respond to natural and built site characteristics in the development of a program and the design of a project.

-Sustainable Design
Understanding of the principles of sustainability in making architecture and urban design decisions that conserve natural and built resources, including culturally important buildings and sites, and in the creation of healthful buildings and communities
- **Building Code Compliance**
  Understanding of the codes, regulations, and standards applicable to a given site and building design, including occupancy classifications, allowable building heights and areas, allowable construction types, separation requirements, occupancy requirements, means of egress, fire protection, and structure.

- **Building Materials and Assemblies**
  Understanding of the principles, conventions, standards, applications, and restrictions pertaining to the manufacture and use of construction materials, components, and assemblies.

- **Building Envelope Systems**
  Understanding of the basic principles and appropriate application and performance of building envelope materials and assemblies.

- **Life Safety**
  Understanding of the basic principles of life-safety systems with an emphasis on egress.
**Bibliography: Required readings:**


Adolf Loos: “Principle of Cladding.” *Spoken into the Void: Adolf Loos collected Writings*.


**Bibliography: Reference Readings:**


Comprehensive Design Studio
ARCH 5120 Spring 2011: MOE

Kiel Moe
moe@neu.edu
Office hours: Thursday: 9:30am-11:30am or by email appt.
1:30-5:40 Monday
1:30-5:40 Thursday

Studio Summary:
This studio is a comprehensive design studio. The studio merges several areas of your education thus far in the elaborated design of a building. In this studio, you will overtly develop a building design by specifying and articulating the many systems that comprise architecture: site systems, energy systems, material systems, structural systems, ventilation, daylighting, program, etc. There will be an additional emphasis on constructed sites as well this year.

The studio is overtly integrated with the co-requisite Integrated Building Systems course. The sequence of lectures follows the sequence of this studio. Your grade for IBS will be determined by your response to the technical requirements of this studio. The technical requirements will include the research, integration and representation of the many technical systems inherent in this, and every, building project.

Each studio section will be working on a topic of specifically generic buildings: buildings not driven by program but rather design based on an assumption of next-uses. Thus, amongst other architectural agendas, this positions architecture’s other functions (the performance of energy, structure, enclosure, material) in the forefront of our consideration. These other functions will be the basis for a range of architectural agendas, different in each section that will augment the larger topic of next-use architecture.

Recommended Texts:
Moe's section of the comp studio will focus on a set of lower-technology, higher-performance approaches to next-use and specifically generic buildings. Lower-technology strategies improve the performance of design practices and buildings not by adding ever-increasing layers of technology, systems, intricacy, specificity and coordination to our practices and buildings but rather by questioning and strategically editing the unwarranted complexity that dominates our buildings, practices, and lives. Today, given current economic and ecological realities, there is considerable efficacy—for our buildings and practices—in de-escalating building technology in order to advance architecture forward. An optimal approach to de-escalation is through more solid and simple monolithic construction systems that are nonetheless capable of achieving, if not far exceeding, the performance evident in a multi-layered, higher-technology building. Further, such simpler assemblies also engender the critical capacities of durability, adaptability, and resilience generally not possible in the excessively additive mentality of contemporary construction logics that are driven by a dynamic of obsolescence. A shift to lower-technology approaches stands to trigger a set of systemic benefits for architecture. Buildings can and must do much more with much less in this century.

In particular, we will study an architecture of cellular solids and supple solids. Cellular solids are familiar materials—certain ceramics such concrete and masonry, and the linear cell assembly of wood—that yield a compelling combination of geometric, structural and thermal performance properties when used in new ways. Supple solids refer to material assemblages such as fabrics, baskets, etc that are certainly solid but are nonetheless supple. We will design buildings that fully utilize simple, cellular solids that can be simultaneously supple in a range of performance conditions and uses (i.e., more solid buildings that engender more supple functions over the decades). The result is ultra-low energy operational and embodies energies; the only real path towards any prospect of sustainability. We will focus specifically on architecture of load-bearing walls of cellular solid materials: foamed ceramics (air-entrained concrete & glass), thin-shell masonry “cohesive constructions”, concrete thermally active surfaces, and solid wood. In most cases, these approaches will yield radically simple, beautiful monolithic constructions (and drawings and models!) that yet solve complex problems and performances for highly integrated buildings, climates, landscapes, and cities. Throughout, we will seek strategic yet surprising and incongruous combinations of minimalisms and maximalisms as we find new, complex performances for simple forms with these old and familiar materials.
Comprehensive Design Studio
ARCH 5120 Spring 2011: MOE

Requirements

- In the first part of the semester, we will work almost exclusively with hand drawing. We will think parametrically and document the process with a set of notations and models. The aim is to work and think faster and more rapidly, leaning less on software and more on the building itself. This demands a highly iterative process and inquisitive attitude in your work. One test, one model, one drawing, one iteration is never enough. A consistent application of serial iterations are highly encouraged (especially for those interested in good work and its associated higher grades).
- Only complete work will be reviewed at any review (desk crit, pin-up, or jury).
- Attend every studio review
- All work this semester will be done in pairs. This reflects the unavoidably collaborative nature of architectural practice. This also raises the expectations of the work (the quantity, quality, depth and breadth of the work).
- At minimum, complete all requirements for the each review. The studio grade will be based primarily upon the major reviews, but process and progress affect the grade as well. I grade each studio session for the quality and quantity of the work.

Objectives and Outcomes

The Comprehensive Studio & Integrated Building Systems respond to the following NAAB Student Performance Criteria:

- **Comprehensive Design**
  Ability to produce an architecture project informed by a comprehensive program, from schematic design through the detailed development of programmatic spaces, structural and environmental systems, life-safety provisions, wall sections, and building assemblies, as may be appropriate; and to assess the completed project with respect to the program's design criteria.

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- **Site Conditions.**
  Ability to respond to natural and built site characteristics in the development of a program and the design of a project.

- **Building Code Compliance**
  Understanding of the codes, regulations, and standards applicable to a given site and building design, including occupancy classifications, allowable building heights and areas, allowable construction types, separation requirements, occupancy requirements, means of egress, fire protection, and structure.

- **Detailed Design Development**
  Ability to assess, select, configure, and detail as an integral part of the design appropriate combinations of building materials, components, and assemblies to satisfy the requirements of building programs.

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  Understanding of the principles of sustainability in making architecture and urban design decisions that conserve natural and built resources, including culturally important buildings and sites, and in the creation of healthful buildings and communities.

- **Building Materials and Assemblies**
  Understanding of the principles, conventions, standards, applications, and restrictions pertaining to the manufacture and use of construction materials, components, and assemblies.

- **Building Envelope Systems**
  Understanding of the basic principles and appropriate application and performance of building envelope materials and assemblies.

- **Life Safety**
  Understanding of the basic principles of life-safety systems with an emphasis on egress.

- **Client Role in Architecture**
  Understanding of the responsibility of the architect to elicit, understand, and resolve the needs of the client, owner, and user.

**Attendance**

Design is a process in which feedback and participation is critical; it is consequently imperative that you attend class and bring drawings and/or models to discuss with the instructor. Three absences will constitute a full grade deduction. More than 3 absences will constitute an automatic failure. Attendance is mandatory at all reviews (refer to course schedule for dates). Less than 3 absences will result in a grade reduction on a curve.
Grading

In accordance with Northeastern Department of Art and Architecture grading policy, grades will be distributed according to the following scale:

**A** superb quality work. **A-** high quality work.

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For more detail refer to [http://www.osccr.neu.edu/policy.html](http://www.osccr.neu.edu/policy.html)
1.1 SYSTEM PRECEDENT ANALYSIS (due on Thursday Jan 13)

Our first assignment will be to build an understanding of the systems of buildings, their integration, and their next-use strategies through the study of relevant built precedents.

<table>
<thead>
<tr>
<th>Material System</th>
<th>Building/Material System Precedent</th>
<th>Next-Use Precedent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load-bearing Masonry 1</td>
<td>Art Gallery, Oktoberdorf, Bearth + Deplazes</td>
<td>Lovejoy Building, Portland, OR, Opsis Architects</td>
</tr>
<tr>
<td>Load-bearing Masonry 2</td>
<td>Köpenick Library, Berlin, Bruno Fioretti Marquez Architekten</td>
<td>Boston Mill/Warehouse Building</td>
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<tr>
<td>Solid Wood</td>
<td>SYSTEM3, MOMA, Oskar Leo Kaufman, Albert Ruf</td>
<td>Temporary Cultural Center, Munich, Florian Nagler</td>
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<tr>
<td>Foamed Concrete &amp; Foamed Glass</td>
<td>House in Chur, Patrick Gartmann</td>
<td>Zollverein School of Management and Design, SANAA</td>
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<tr>
<td>Concrete Insulated: Panelized(Pre-Cast/Tilt-Up)</td>
<td>Gleneagles Community Center, Patkau Architects</td>
<td>Herman Miller Cherokee Operations Center, Scogin/Elam</td>
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<tr>
<td>Concrete Insulated: Site-Based, Site Cast</td>
<td>&quot;Solarcrete&quot; industrial buildings</td>
<td>Salk Institute, Louis Kahn</td>
</tr>
</tbody>
</table>

RESEARCH and DOCUMENTATION

Choose one precedent pair per team. For the System precedent document the strategies for structure, and enclosure, energy systems. First you must research the buildings in the libraries for the needed information. Then you must document and demonstrate aspects of all three basic systems. It is critical that you construct your own documentation of each project. Produce your own diagram and analysis. This must be all original work. For the Next-use precedent, document how the structure, and enclosure, energy systems are designed so as to engender next-uses.

Your documentation drawings shall be axonometric [not perspective] line drawings, and they will be the basis for your integration and flexibility/adaptability analyses. You may use color discretely to highlight an analytical subject in the line drawings.

These drawings will be diagrammatic: find the correct balance of just-enough information. Do not try to add too much detail: you will not have time. How you demonstrate complex ideas in clear, legible, and simple visual terms will be a constant focus of this semester.

Organized and coherent 11”x17” sheets for:

**Building/Material System Precedent**

1. Structure
   - Construction type [add labels]
   - Structural pattern
   - Structural dimension [add dimensions on your drawings]

2. Enclosure
   - Construction type [add labels]
   - Fenestration pattern
   - Fenestration ratios [add ratios on your drawings]

3. Energy
   - Climate
   - Heating
   - Cooling
   - Ventilation
   - Day lighting

**Next-Use Precedent**

Analyze and represent how the building has been/can be used over time. Articulate its material, structural, energy and spatial strategies for next-uses.
1.2 ANALYSIS (due on Thursday Jan 20)

Revise your analysis of the precedent buildings first. Then, begin work on project 2.0.

Organized and coherent 11”x17” sheets for:

Building/Material System Precedent

1. Structure
   Construction type [add labels]
   Structural pattern
   Structural dimension [add dimensions on your drawings]

2. Enclosure
   Construction type [add labels]
   Fenestration pattern
   Fenestration ratios [add ratios on your drawings]

3. Energy
   Climate
   Heating
   Cooling
   Ventilation
   Day lighting

4. Systems Integration
   Intertwined systems
   Multiple functioning systems

Next-Use Precedent

Analyze and represent how the building has been/can be used over time. Articulate its material, structural, energy and spatial strategies for next-uses.
2.1 SYSTEMS DESIGN VERSIONING: STRUCTURE + ENCLOSURE + ENERGY (due Thursday Jan 20)

Due to your precedent analyses, previous building technology courses, design studios, and your professional experiences, you now possess a good foundation for thinking about structure in both conventional and non-conventional terms. The following is an opportunity to stretch your thinking about these systems as a source of problem-solving innovations. These decisions should be based on a stance, or theory, or thesis about building systems.

Now that you have begun to think about buildings as the integration of systems and their possible adaptability, you will now begin to design your own innovative building systems. This next phase will again exist between research and design. You will apply the same creative and rational thought to designing systems as you would a more conventional architectural program, such as a library or museum.

First, read “Versioning: Connubial Reciprocities of Surface and Space” by Monica Ponce de Leon and Nader Tehrani

Second, delve into the geometric/structural precedents for your material system listed below. Use one 11x17 sheet to document what the tessellation unit is and articulate how it is used in the corresponding precedent. While you may include a couple of photos, the focus should be on abstracting and diagramming the systems involved in the project.

<table>
<thead>
<tr>
<th>Material System</th>
<th>Roof Tectonic Tessellation Base Unit</th>
<th>Roof Tectonic Tessellation precedent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load-bearing Masonry 1</td>
<td>Voronoi</td>
<td>Mapungubwe National Park Interpretive Centre, Peter Rich</td>
</tr>
<tr>
<td>Load-bearing Masonry 2</td>
<td>Sloped Barrel Vaults</td>
<td>St. Peters, Klippan, Lewerwentz</td>
</tr>
<tr>
<td>Solid Wood</td>
<td>Horizontal One Way with Differentiated Repetition (i.e. Ruled Surface)</td>
<td>Minneapolis Rowing Club Boathouse, VJAA</td>
</tr>
<tr>
<td>Foamed Concrete &amp; Foamed Glass</td>
<td>Two-Way Plate/Frame</td>
<td>Sudwestmetal Office Building, Dominik Dreiner</td>
</tr>
<tr>
<td>Concrete Insulated: Panelized</td>
<td>Folded Plate (pre-cast)</td>
<td>Farshid Moussavi, The Function of Form, p. 348-351</td>
</tr>
<tr>
<td>(Pre-Cast/Tilt-Up)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete Insulated: Site-Based</td>
<td>Cellular Folded Plate (site cast)</td>
<td>House in Kohoku, Torafu</td>
</tr>
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</tbody>
</table>

Third, and this is certainly the bulk of your work, you will rapidly—but coherently—develop a set of design strategies based on advancing aspects of your 4 precedent system studies to date. The emphasis here is on strategies in contrast to the intricacies of “design” (strategies focus more on way of approaching the problem, establishing performance criteria, and leveraging opportunity for architectural ends that will be elaborated). To do so, you will build a set of six bay models that test different and novel structural, enclosure, and energy configurations/strategies for your systems. These models will test different scenarios in a related series. The intent here is not to make different schemes but rather test the limits of different logics and study their effects.

Since each model will test different assumptions, the result should be a set of feedback loops that accrues knowledge in the process of developing these different versions of the system. In this way, this is seen as much as a testing process as it is a design process (in other words we are testing to better understand design parameters and effects). To do so, you might let different parameters guide the development of the different schemes. The objective should be understanding the possibilities and limits of your material system from formal, structural, assembly, and energy points of view (there are four starting points right there!).

A few parameters to observe:
- roof structures must be self-draining (i.e. there will be sloped geometries in the tessellation of the roof structure)
- no columns: treat the enclosure of small spaces as hollow columns or use load bearing walls
- 30-40% glazed exterior surfaces

The deliverables (what is due on Monday Jan 20) will be your tessellation precedent analysis and a set of six well-crafted bay models of the different versions, each with legible variations in system parameters. Each version should be accompanied by a set of analog system notations and diagrams that explain what system parameters guided that iteration and what was learned. These can be understood as analog parametric models.

The models will include multiple bays of a building that is 3 stories tall to test and evaluate coherent organizations of your structural/enclosure/energy system in an aggregated form. Your 3 stories must include a ground level, and intermediate level, and an upper level with a roof. Model structural bays at the end of a building, so that the building envelope wraps three sides of the model. The maximum width of the floor plate is 50’.

The models will be at 1/8”=1-0” scale and need a solid base. Use model materials that model the actual materials of your system.

The models will be complemented by drawings and diagrams in your sketch books. I will be looking for evidence of specifically architectural thinking in the drawings (number, pattern, material, technique). The drawings and diagrams should be iterative. The goal is to be thinking parametrically, i.e. how do different systems relate and merge, how can one system do multiple functions, and what is the resultant behavior.
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2.2-2.4 STRUCTURE/ENCLOSURE/ENERGY/CLIMATE SYSTEM DEVELOPMENT (due Mon Jan 24)
Working with your precedent system, in this phase of work you will advance the configuration and integration of structural/enclosure/energy system based on your review of versioning exercises.

You should now further consider how the vertical and lateral structure, energy systems, and enclosure work symbiotically. Using this system, develop multiple bays of a building (including an end bay), that is 3 stories tall to determine coherent organizations of your structural/enclosure/energy system in an aggregated form. Your 3 stories must include a ground level, and intermediate level, and an upper level with a roof.

Structure: Structure captures gravity and lateral loads. Your structural system must resolve these forces with a reasonable set of spans and bearing elements along a set of designed load paths down to an appropriate foundation system. Document both your system and its performance. (refer to: Ed Allen's Architect's Studio Companion and Fundamentals of Construction as necessary to present correct structural and building assembly information)

Enclosure: Enclosure mediates a range of energy systems; it is but one layer in a series of systems that modulates interior and exterior forces. There should an emphasis on how your envelope strategically controls solar energy, thermal energies, and convective energies. Simultaneously, the building envelope is the primary system related to the appearance of the building, so a formal agenda of the building must be aligned and developed with more technical performances of the enclosure. Thus, you must articulate the formal agenda for the building. Your sections must be cut through window/door/skylight openings in the enclosure (hence you have to think about how and why you make an opening in a wall and establish how those decisions achieve their desired ends). (refer to: Ed Allen’s Fundamentals of Construction and the Birkhauser Construction Manuals as necessary to present correct building assembly information)

Energy/Climate: Material systems are energy systems. Material systems also capture and channel energy systems when designed correctly. This phase of work must integrate observations about climate and the exterior milieu, and the configuration and performance energy systems in your building. These include solar (alternately fee heat and free light), thermal (structural solutions vs power-operated solutions), and ventilation strategies. There should be an emphasis in this phase on Lechner’s first tier solutions (i.e., strategies that use the configuration of the building to induce desired energy performances). (refer to: Lechner’s Heating, Cooling, and Lighting as necessary to present correct energy systems information.)

You do not have a site, so just situate your

Use Eco Tect to generate raw data for your climate analysis. DO NOT MERELY PRINT THIS RAW DATA, however. It is critical that you interpret and re-p resent this data, indicating and articulating what information is relevant in the pool of raw data that you have used to guide design decisions. In Illustrator, you must create hierarchy in the Eco Tect data by adjusting lineweight, highlighting certain information. Ultimately, you must connect design decisions to climate analysis.

The deliverables (what is due on Monday Jan 24) will be at least two 3/16”=1'-0" models of the new system iterations. Like the versioning models, these models are for design thinking, not design documentation; they should teach you something about your systems in theory and in practice. The models and any associated notations should be a rehearsal of the system’s construction: starting from the foundation, building the model as it would be built on site. Nonetheless, these models must be well-crafted and on a solid base.

The models will be complemented by drawings and diagrams in your sketch books. I will be looking for evidence of specifically architectural thinking in the drawings (number, pattern, material, technique). The drawings and diagrams should be iterative. The goal is to be thinking parametrically, i.e. how do different systems merge, how can one system do multiple functions, and what is the resultant behavior.


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2.5 STRUCTURE/ENCLOSURE/ENERGY/CLIMATE SYSTEM CRITIQUE (due Thursday Jan 27)

STATEMENT
Write a 100-word statement about the ARCHITECTURAL ambition of the model and how it achieves those ends. This should not describe your systems (your drawings and models are for that), rather your statement should state a thesis about material systems, assembly and their relationship to your formal agenda for the project.

CLIMATE STRATEGY
Print one 11x17" that presents your climate interpretation and OVERTLY state how your understanding of the climate suggests particular pathways and opportunities for your project.

FOOTNOTES
Present the structure and enclosure precedents for your work. Present these as Footnotes to your work.

MODELS
Present the any and all relevant iteration models from phase 2.0 at the Systems critique. Also present a new systems design bay model at 1/4" scale of your structure + enclosure + energy + climate system using only the following materials: basswood; mahogany; Baltic birch plywood; white museum board; or multiply chipboard. Your 3 stories must include a ground level, an intermediate level, and an upper level with a roof. You must also consider and represent what type of foundation supports you are proposing. These models should clearly demonstrating your design thinking.

DRAWINGS
The models will be complemented by drawings and diagrams in your sketch books. I will be looking for evidence of specifically architectural thinking in the drawings (number, pattern, material, technique). The drawings and diagrams should be iterative. The goal is to be thinking parametrically, i.e. how do different systems merge, how can one system do multiple functions, and what is the resultant behavior.

Further, the model itself should exhibit drawing: measurement and lineation. I need to see evidence of measurement in the craft of the model.

The above minimum requirements are just that, requirements. You must compose a graphic and verbal presentation with these minimum requirements. You can clearly go beyond these requirements if you wish.

MYFILES submission for IBS/Studio grading: There will be one folder for each team on Moe’s MyFile site (i.e., 5 or 6 folders on the CD from each studio). Within that folder, drop 6 model photos JPGs, 6 scans of key drawings from your sketchbook JPGs, your statement PDF, Footnotes PDF, and Climate Strategy PDFs. Any teams no on the CD will not be graded. The file name format is: “Studioinstructor_Team Last Names.” (MOE_Smith Doe.pdf)
3.1 PROTOTYPE DESIGN (due on Monday Feb 7)

Now that you have begun to design integrated systems, you will aggregate your systems concept to a logical building prototype. Your prototype will incorporate not only the integration of its structure/enclosure/energy/climate systems, but now also its logics for circulation and adaptability for next-uses and long-term durability.

You first effort is to incorporate and advance your prototype based on the comments from the Systems Critique. This may suggest anything from a dimensional refinement to a construction or enclosure switch. The focus in this iteration is on incorporating feedback from the review. In all cases, these revisions must pursue technical and formal ambitions with equal rigor.

The deliverables (what is due on Monday Feb 7) will be at least one 1/4”=1'-0” model of the new system iteration accompanied by any drawings, diagrams and other notations about the systems and its transformations from the review. The models and any associated notations should be a rehearsal of the system’s construction: starting from the foundation, building the model as it would be built on site.
3.1 Prototype Building Design: Building (due Feb 7)

Once you have refined your systems concept for structure, enclosure, and energy systems based on the review, aggregate your concept to a studied set of dimensions for a 3-to-4-story building considering the possible uses that your building might contain. Your overall gross square footage shall be between 20,000sf and 30,000sf. Your building may be no wider than 50 feet wide.

At this stage, in addition to the structure, enclosure, and climate strategies you have developed, you now need to incorporate the necessary vertical and horizontal circulation systems, into your prototype. This presupposes developing a coherent plan for your building. You must design a logical entry for your prototype at the ground levels that emerges from the logic of your building’s construction type. You must have two means of egress, and no point of your plan may be 75 feet from a means of egress. You must have two elevators (one public, one service), and you must have two ADA bathrooms for a total of 200sf per floor. You must include a loading dock that spatially connects to the service elevator [typically not used by building occupants, only by building management] that also emerges from the logic of your building’s construction type. Like your primary structure, these will be fixed elements in your design, but it is not necessary for these elements to be contained within a traditional core. These fixed elements must be integrated into your design concept, not simply superimposed onto your systems concept. You must also incorporate adequately designed mechanical rooms, chases, and distribution logics. The focus here should be on the strategic planning and placement of these requirements and how they can be fundamentally integrated into the prototype (i.e., how can these requirements be exploited to do more work and more architectural work rather than be a mere requirement.)

Begin to incorporate next-use flexibility into your prototype. Begin to think rigorously and iteratively about alternate use scenarios to establish how your building will accommodate a range of uses over time. A critical aspect of this design is what material/energy systems are more permanent and what are more transient, key dimensions that allow space to be divided or used over time, and how other systems interact and support these changing uses. Your design must transcend the generic: you should strive for a prototype that is both flexible and uniquely innovative.

This is an opportunity to stretch your thinking about these aggregated systems as a source of creative plus problem-solving innovation. These decisions should be based on a stance, or theory, or thesis about integrated building design as well as a formal agenda for the building.

3.2 DRAWINGS

Draw, at 1/8” scale, foundation plan, all floor plans, roof plan, two lateral sections or section perspectives, and all elevations on 11x17 [or as needed]. There should be at least one ¼” lateral section.

3.2 MODEL

Build a model at 1/8” scale of your prototype building. Your 3 stories + foundation model must include at least a solid ground level with grade represented (say a piece of MDF), an intermediate level, and an upper level with a roof. This model should test you something about your aggregated integrated design in theory and in practice. It should be well crafted, using materials relevant to your systems and formal agenda. The models and any associated notations should be a rehearsal of the system’s construction: starting from the foundation, building the model as it would be built on site.
3.3-3.4 Prototype Building Design: Development (due Feb 14)

In this phase of work, you will plan two different types of uses for your building, and you will develop the necessary details to ensure an efficient transformation between uses. One use will be an open plan, such as an art gallery or open office space. It must have one double or triple height space of 500 sq ft., and you must devise an efficient way to reclaim that 500 sq ft on each floor. The non-egress stair may be within this double or triple height space.

The other use will have a series of small spaces with a corridor connecting your two means of egress. You may have any combination of 200 sq ft, 500 sq ft, and 1000 sq ft spaces, with no more than 25% of your floor area as open, common, or circulation [including corridor, stair, and elevator] space.

This is an opportunity to stretch your thinking about prototypes adaptability as a source of creative plus problem-solving innovation. These decisions should be based on a stance, or theory, or thesis about integrated building design. Your adaptability strategy may require that you change your overall design significantly: do not resist the change! Let the new criteria and creative thinking lead you to new, improved designs. If your design does not evolve, you are not doing your job.

DRAWINGS

Draw, at 1/8”scale, foundation plan, all floor plans for both uses scenarios, a roof plan, two sections or section perspectives, and all elevations on 11x17 [or as needed]. There should be at least one ¼” section.

MODEL

Build a model at 1/8” scale of your prototype building. Your 3 stories + foundation model must include at least a solid ground level with grade represented (say a piece of MDF), an intermediate level, and an upper level with a roof. This model should test you something about your aggregated integrated design in theory and in practice. It should be well crafted, using materials relevant to your systems and formal agenda. The models and any associated notations should be a rehearsal of the system’s construction: starting from the foundation, building the model as it would be built on site.
3.5 NEXT-USE SYSTEMS DESIGN BUILDING CRITIQUE (Thursday Feb 24)

Your Mid-Term Review will review the status of your building: its structural, enclosure, energy, climate, and next-use systems and its performance. The merits of the work will be evaluated equally with the merits of your architectural agenda for these systems.

STATEMENT
Write a 100-word statement. This should be your stance/theory/thesis about integrated design and next-use. This should not describe your prototype: it should describe your thesis about your prototype. Print this to be posted at your presentation.

DRAWINGS
- foundation plan
- all floor plans
- roof plan
- one lateral and one longitudinal section or section perspectives
- 1/2" wall section
- all elevations
- a couple of perspective DRAWINGS or a proper RENDERINGS (not a Sketchup JPEG Export, use V-Ray or some other rendering software at minimum)

INTEGRATION AXON AND DIAGRAMS
- A large axon that demonstrates the integrated systems used and their performance
- structural/framing diagrams of lateral system and gravity load system
- energy system diagrams (diagram the systems and the performance): thermal, daylight, distribution logics
- Additional notations required to demonstrate both the systems and their performance
- Relevant climate strategy documentation that substantiate design decisions
- at least 3 diagrams that demonstrate your next-use transformation strategy (fixed/flexible, circulation, etc)
- any relevant climate

MODELS
- Present any and all relevant models at this review that support the development of your work this semester and its agenda.

  - Build a model at 1/8" scale of your prototype building. Your 3 stories + foundation model must include at least a solid ground level with grade represented (say a piece of MDF), an intermediate level, and an upper level with a roof. This model should test you something about your aggregated integrated design in theory and in practice. It should be well crafted, using materials relevant to your systems and formal agenda. The models and any associated notations should be a rehearsal of the system's construction: starting from the foundation, building the model as it would be built on site.

  - Build a ½" wall section/corner model. This model will extend from the foundation to the roof. It models both your understanding of the enclosure’s assembly and its formal performance. It should be well crafted, using materials relevant to your systems and formal agenda. The models and any associated notations should be a rehearsal of the system’s construction: starting from the foundation, building the model as it would be built on site. This model should directly rehearse the sequence of construction. It will include a corner and more than one bay of structure. The model must indicate the sequence of construction.

All models, diagrams, and drawings must be extremely well crafted.

The above minimum requirements are just that, requirements. You must compose a graphic and verbal presentation with these minimum requirements. You can clearly go beyond these requirements if you wish.

Blackboard submission for IBS/Studio grading: Submit one PDF of your presentation materials (including photos of models) to the assignment section of Blackboard. The file name format is: “Studioinstructor_Team Last Names.” (MOE_Smith Doe.pdf)
4.1 Site Visit and Documentation (due on Monday Mar 7)

You have now created a position and a prototype for addressing next-use in architecture. Now that you have a viable prototype building that integrates structural, enclosure, energy, and climate systems, you will now work to integrate your prototype building into a site such that the site becomes an integral system to the building, and such that the building becomes an integral system to its topographical, climatological, and physical context.

Although you designed your prototype in the abstract, it, too, is a site. It is a site of your thinking, and it already has a relationship to the climatological context. You must identify what energy sources exist on the site that you can utilize through building configuration, solar orientation, wind direction, or other viable energy capturing strategies. You must also develop a contextual logic to engage the site topologically, spatially, and functionally by manipulating section, edges, objects, dimension, proportion, scale, rhythm, materials, and image. Similarly, you must develop a use-logic to locate building entrances, circulation paths, and service docks.

Not all of your current systems will persist in tact in a site-response transformation. You need to develop a site logic that responds to traditional contextual considerations (climate, topography, adjacent buildings, etc) and the systems, prototype, and future-use strategies you have been focused on to date.

The first step is to visit the site. While there, discern key attributes of the sites qualities and make at least (2) photo collages of the site’s determining factors and conditions (physical collages, not prints of digital collages). One should be more sectional, one should be more plan oriented. The site and its context and develop critical insight on the following questions:

What is your site?
How is it defined?
What are its boundaries?
What is its composition?
What determines your site?

Your photo collages should answer these questions. Sites are not neutral and empty parcels for a future building. Sites are composed and constructed by a set of factors and forces that determine their appearance and performance. The purpose of the collages is for you to determine, frame, and articulate a set of site issues that you think determine the site.

Second, prepare a comprehensive yet concise set of plan and section drawings/diagrams/maps/notations that capture what determines the site. These documents should also answer the questions above.

The deliverables (what is due on Monday Mar 7) will be 11x17” color, hard copy set of your site analysis and (2) large photo collages, physical collages, not prints of digital collages.
4.2 Site Systems (due Mar Thursday 10): section profile model

Based on our discussion of your site observations, collages, and drawings/diagrams, in this phase of work you will develop a particular type of site model. The model will consider the area immediately around the building as a series of sectional circumstances in the site.

To develop the 1/16" section profile model model, interpolate the contours of the site, raise them to their correct elevations in AutoCad. Export these contour lines to Sketchup and use the sandbox to create a surface from the contours. Next, striate this surface with a series of vertical planes to create a series of section profiles. The location of these profiles should be related to the logic of the site, as determined by you. These profiles must be coupled with an armature of some sort, also determined by you, that will interlock with and support the section profiles.

The choice of where you cut the section profiles (what direction, how frequently) must be considered, designed. These might relate to something on the site or something related to your previous prototype. In either case, it must be observed that your already structuring a significant site relationship through the determination of the sections.

The overall model must be at least 10"x20" (165'x 300' or so), but may be larger depending on your definition of the site. It must include the face of the Rudolph Building—Jewett Hall—that faces our site, as part of the sectional cuts. Design the model — it need not be orthogonal and might (or should!) reach out capture some of the more idiosyncratic aspects of the site and contexts — just be deliberate in your choices about the site! Your definition of site based on your visit should guide these choices.

The armature should likewise be deliberate; perhaps be related to the site in some way (i.e. the location/width of roads/pathways or perhaps indication of north/south or east/west lines, etc. (You will use this armature throughout the semester as you modify the section for your eventual building.) Export these profiles to AutoCad for drafting and printing. Assemble the section profiles on the armature. The task here is, again, one of site definition. This is not mere documentation but rather design through parameter definition. You will continue to respond to these parameters in subsequent exercises.

The deliverables (what is due on Monday Mar 7) will be two site models:
- 1/16" section profile model (chip board profiles, wood or MDF armature) design the model!!!!!
4.3 Grounding (due Monday Mar 14)

In this phase of work you will work exclusively on the design of a foundation for your project, the grounding of architecture. The focus here is on the design of strategies for constructing the ground. You will have to negotiate the existing topological character and infrastructure of site, consider the ground’s capacities to capture and channel water, capture and channel solar energy, embed infrastructure and utilities as well as ground a building and its foundation system.

You do not have a program, much less a building right now. All you have is a site, its literal and latent capacities, and some knowledge of your prototypical system. No one has a building yet. In this assignment, you will take advantage of these capacities by designing strategies for leveling, capturing, channeling, and engagement with the ground. Ultimately what you are designing in this stage is a site model that articulates this range of strategies. Design the model itself. The size of the eventual building on your site does not matter for this phase of work. The focus is on designing strategies for the ground of your site. Remember, a compelling building will emerge from a compelling ground strategy.

First, construct a series of bas-reliefs of the site. These bas-reliefs are intended to be a fast way of designing an iterative set of ideas related to the site. They should indicate organizational strategies, compositional issues of patterning and space, and the integration of existing conditions: ground, movement, etc.

Second, after the bas-reliefs studies, use the profile model will propose your site strategies. The profile model should indicate how a building can emerge from the logics of the site. There will be no indications of a building, only the foundation and other elements of constructed ground.

The deliverables (what is due on Thursday Mar 17):

- (4) 1:50 site bas-relief diagrams/notations (white museum board on a flat base.
- A new 1/16" profile model with modifications that integrate strategies for:
  - Foundation
  - Topological engagement
  - Circulation of water, people
  - Leveling
4.4 Workshop with Landscape Architects (what is due on Thursday Mar 17)

Revise your constructed ground models (bas-reliefs and various profile models) and prepare a 1/32"=1'-0" site plan and any related site diagrams to articulate your intentions for the site and grounding strategies.

- revised manifesto for building/site intentions. 50 words.

-1/16" mode in the section profile model (chip board profiles, wood or MDF armature) with new building foundation model

-1/50 site plan and aerial photos.

-site collages.

-site diagrams

-all floor plans, with particular emphasis on the foundation.

-two pertinent lateral sections, with particular emphasis on the foundation and relationship to ground

-each elevation (an elevation is a site section – take care when drawing the ground.

-diagrams/notations of the relevant climate interpretations and strategies.
**4.5 Site and Building Transformation: Eight is (not) Enough** (what is due on Monday Mar 21)

Based on your discussions with landscape architects, you now should have a fairly well-informed and well-structured strategy for the site. It is time now to integrate the full building to the project. A key question here is how you will merge ideas about building performance and the site.  

Version your building prototype (now at 50,000 sq ft) and your site. In addition to next-use space (and its daylight and other climate strategies), of particular importance at this stage of building/site planning is the location of key services (cores and other building infrastructure):

- Fire-rated egress stairs as needed: maximum distance of travel to an egress stair is 100’
- 2 passenger elevators: 80sf cab area each minimum, add for fire rated structure, rails, etc.
- 1 service elevator: 120sf cab area minimum, add for fire rated structure, rails, etc.
- Each floor bathrooms [men’s and women’s]: 400sf per floor
- 1 each floor utility closet with large sink: 100sf
- 1 mechanical room with direct access to the exterior and a building loading dock.

The deliverables: Version eight iterations for site/building combinations at 1/16”=1'-0". To do so, you will need to work quickly but intelligently. The focus here is on organizational logics and their consequences for the integration of building performance and formal agendas. Each version will have its own 11”x17” base and can be accompanied by one 11”x17” sheet with any explanatory diagrams. Determine a limited and consistent palette of modeling materials early and stick to it. Blue foam can be useful here. Major building cores and infrastructure should be legible in these models.
Based on your discussion of your versioning models, at once advance the planning and design of your building. In particular, study the envelope of the building and its relation to the site and milieu of the project.

Elaborate the design of your scheme by developing the building envelope. The architectural intentions and process that has developed the project thus far should drive the elaboration of the building envelope. The technical systems and assemblies that you research and include in your building envelope, again, are not architecture unto themselves. It is critical that the systems— performances and effects—amplify and reinforce your design ambitions. They must also be appropriate and adequately resolved technically.

Once the architectural intentions and agendas are determined, develop a (2-D) 1/2” wall section of your project that captures typical conditions. The selection of the cut is important: it should be demonstrative of your intentions at detail and performative levels. It should be in an area of the building that samples the systems used throughout the building. It should not be an entirely idiosyncratic or aberrant condition. It should also extend into the building far enough to capture typical floor, ceiling, and roof conditions (ideally including roof penetrations as appropriate. Accurately draw the wall section, starting from the bottom of the foundation through the top piece flashing, in the sequence of construction. Recall the quote from Kahn:

“If we were to train ourselves to draw as we build, from the bottom up, stopping our pencils at the joints of pouring or erecting, ornament would evolve out of our love for the perfection of construction and we would develop new methods of construction. It would follow that the pasting on of lighting and acoustical material, the burying of tortured unwanted ducts, conduits, and pipelines would become intolerable. How it was done, how it works, should filter through the entire process of building, to architect, engineer, builder, and craftsman in the trades.”

If you are uncertain how something is built, what it looks like in a building, or how it is drawn, you must look it up. Finding precedents in both drawing form and photograph form can be useful if you are uncertain. Several resources are available:
- The Birkhauser Construction Manuals (Steel, Glass, Masonry, Concrete, Façade, Roof, etc)
- Detail Magazine
- Tectonica Magazine

As you develop the wall section, keep in mind:
- The continuity of the thermal envelope (no structure outside the thermal envelope)
- Air barriers, water barriers, vapor barriers
- Ideally the envelope is about 20-30% glazed

The Deliverables: develop revisions and changes of you overall scheme.
- 1/16” plans
- 1/8” longitudinal and lateral sections
- 1/2” wall section of typical conditions that includes site conditions (10’ into the building, 20’ of site). Draw from the bottom up and rehearses the construction of the building. This drawing will be reviewed both for design intent and technical content. Pursue both with equal rigor. Present evidence of your precedent research for reference. Also include a plan section of the same wall condition.
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5.1 Envelope: Assembly (due on Monday Mar 28)

Building Envelope Development

Based on our discussion of the review and discussion of the building envelope with your critic, revise the wall section, refining both the architectural intent and technical content. As with any section, draw from the bottom up. Using the wall section as a base, construct either a section perspective or axon of the building envelope. This involves essentially extruding the wall section into more anomalous conditions that must be considered (what happens when the envelope system turns a corner, meets a window, or changes its profile. Mind the thermal envelope and continuity of the various barriers in this condition. The aim of this drawing is to test the building’s surface effects and performance of the technical decisions embedded in the wall section.

Building Scale Systems Development

Revise and refine the building systems diagrams (in most cases a combination of 3-D and 2-D views will best visually explain the system and performance.)

- **context:** which contexts are you responding to: how and why the building is positioned where it is.
- **site:** truck access, harbor walk, exterior programs, public programs, parking, etc.
- **structural:** lateral loads, gravity loads, from the roof down through the pile system
- **thermal:** heating and cooling strategy and system. Location(s) of mechanical plant, distribution logic, and energy source. Include a diagram at the scale of the whole building (axon) and one at the scale of an individual space.
- **Thermal Envelope diagram:** ¼" Section through entire building that shows the thermal envelope. Use section breaks to remove redundant information. The drawing should capture conditions as they change around the building (at windows, doors, roof edges, roof penetrations, the foundation, etc)
- **ventilation:** ventilation strategy and system. Location(s) of mechanical plant, distribution logic, and supply return location. Include a diagram at the scale of the whole building (axon) and one at the scale of an office or dorm space. Any passive strategies must include a wind rose on the diagram for the periods of the year that passive ventilation is intended, with the plan oriented correctly on the wind rose.
- **program:** organization of program spaces with travel route from day room to apparatus bays listed and dimensioned
- **circulation:** primary horizontal and vertical circulation paths. Indicate elevator location and elevator equipment rooms.
- **life safety:** means of egress diagrams with maximum travel distances listed
- **day lighting:** strategy and system of capturing and channeling diffuse light. All daylight diagrams must include appropriate 2D and 3d solar path diagrams.
- **Solar Control:** strategy and system for control direct light. All solar control diagrams must include appropriate 2D and 3d solar path diagrams.
- **water systems:** grey water capture, channeling, holding system, related site systems

The deliverables (what is due on Monday Mar 28) will be:

1. 3/8" Section Perspective or Axon of the building envelope.
2. Revised, updated versions of the building system diagrams
3. Building models as required by instructor
5.2 Envelopes: Performance (due Thursday Mar 31)

Building Envelope Development

Based on our discussion of the review and discussion of the building envelope section perspective/axon with your critic, revise the wall section, refining both the architectural intent and technical content. As with any section, draw from the bottom up.

Using the building envelope section perspective/axon as a base, elaborate this drawing by indicating the assembly of the building envelope by showing the multiple layers in the sequence of installation. This should verify the sequence of construction, constructability, and serviceability of the building envelope.

Clearly indicate the thermal envelope in this drawing with an appropriate color.

Building Scale Systems Development

Revise and refine the building systems diagrams as necessary in preparation for the Tech review (scheduled for Mar 30). (in most cases a combination of 3-D and 2-D views will best visually explain the system and performance.)

The deliverables (what is due on Thursday Mar 31) will be two site models:
1. 1/2" Section Perspective or Axon of the building envelope.
2. Revised, updated versions of the building system diagrams
3. Building models as required by instructor
5.3 Envelopes: Openings (due on Monday Apr 4)

Building Envelope Development

Based on our discussion of the review and discussion of the building envelope section perspective/axon with your critic, revise the wall section, refining both the architectural intent and technical content. As with any section, draw from the bottom up. In this version, focus in particular on at least one good window and one good door.

Using the building envelope section perspective/axon as a base, elaborate this drawing by indicating the assembly of the building envelope by showing the multiple layers in the sequence of installation. This should verify the sequence of construction, constructability, and serviceability of the building envelope.

Clearly indicate the thermal envelope in this drawing with an appropriate color.

Building Scale Systems Development

Revise and refine the building systems diagrams as necessary in preparation for the Tech review (scheduled for Mar 30). (in most cases a combination of 3-D and 2-D views will best visually explain the system and performance.)

Construct a new, current model of the whole building on its site.

The deliverables (what is due on Monday Apr 4) will be two site models:
1. 1/2" Section Perspective or Axon of the building envelope.
2. Revised, updated versions of the building system diagrams
3. Building model
5.4 Building Synthesis Review (due Monday Apr 11)

Requirements

-a complete set of plans, sections, and elevations (remember these are all site sections and must include adjacent context. Sets without adjacent context cannot be graded in IBS)

-Diagrams: again, the criteria for evaluation is the continuity between your architectural intent and the technical accuracy and efficacy of the systems represented. This systems should be presented in such a way that they foreground architectural intentions, using the systems as the support for the agenda.

-context: illustrate which contexts you are responding to. Illustrate how and why the building is positioned where it is.
-climate: not just Ecotect data but rather a thorough analysis of the data as one generator for form: articulate graphically and verbally your climatic condition and your response in terms of building shape and systems.
-site: topographic response strategy, exterior programs, public programs, parking, truck access, harbor walk, etc.
-structural: trace load paths for lateral loads, gravity loads, from the roof down through the pile system
-thermal: heating and cooling strategy and system. Location(s) of mechanical plant, distribution logic, and energy source (power grid, site-sourced, other). Include a diagram at the scale of the whole building (axon) and one at the scale of an office or dorm space.
-ventilation: ventilation strategy and system. Location(s) of mechanical plant, distribution logic, and supply return location. Include a diagram at the scale of the whole building (axon) and one at the scale of an office or dorm space. Any passive strategies must include a wind rose on the diagram for the periods of the year that passive ventilation is intended, with the plan oriented correctly on the wind rose.
-next-use: illustration of architectural strategies that accommodate/trigger next uses of the building; its complex adaptability
-circulation: primary horizontal and vertical circulation paths. Indicate elevator location and elevator equipment rooms.
-life safety: means of egress diagrams with maximum travel distances listed
-day/lighting: strategy and system of capturing and channeling diffuse light. All daylight diagrams must include appropriate 2D and 3d solar path diagrams.
-solar control: strategy and system for control direct light. All solar control diagrams must include appropriate 2D and 3d solar path diagrams.
-water systems: grey water capture, channeling, holding system

-The Building Envelope Section Perspective/Axon @ ½"

The deliverables (what is due on Monday Apr 11 for IBS):
1. Presentation drawings and diagrams, previous models
2. Post your PDF presentation and Building Envelope Section Perspective/Axon on the Blackboard IBS site (discussion, under "April 11 submissions"). Post only one file with your section name followed by your last names: "MOE_Lemon Donaghy".

Only vector based drawings from CAD or Illustrator will be graded. NO pixilated images will be graded for IBS.
6.1 Final Review (due Thursday Apr 27/28)

**PENCILS DOWN TUESDAY MONDAY 4/25, 8pm!!**

Requirements

Present a 6 minute PowerPoint slideshow of your project. Use only PowerPoint: do not use PDFs (you can export jpeg slides from InDesign). All Powerpoint files must be loaded onto one computer by 4/25 8pm. A CD submission (described below) is due at 4/25 8pm. You must follow these guidelines or you will not get credit for this exercise.

Requirements: (not everything listed may be in your presentation, all are required for IBS):

- **a complete set of plans, sections, and elevations** (remember these are all site sections and must include adjacent context. Sets without adjacent context cannot be graded in IBS)

- **Diagrams:** again, the criteria for evaluation is the continuity between your architectural intent and the technical accuracy and efficacy of the systems represented. This systems should be presented in such a way that they foreground architectural intentions, using the systems as the support for the agenda.

  - **context:** illustrate which contexts you are responding to. Illustrate how and why the building is positioned where it is.
  - **climate:** not just Ecotect data but rather a thorough analysis of the data as one generator for form: articulate graphically and verbally your climatic condition and your response in terms of building shape and systems.
  - **site:** topographic response strategy, exterior programs, public programs, parking, truck access, harbor walk, etc.
  - **structural:** trace load paths for lateral loads, gravity loads, from the roof down through the pile system
  - **thermal:** heating and cooling strategy and system. Location(s) of mechanical plant, distribution logic, and energy source (power grid, site-sourced, other). Include a diagram at the scale of the whole building (axon) and one at the scale of an office or dorm space.
  - **ventilation:** ventilation strategy and system. Location(s) of mechanical plant, distribution logic, and supply return location. Include a diagram at the scale of the whole building (axon) and one at the scale of an office or dorm space. Any passive strategies must include a wind rose on the diagram for the periods of the year that passive ventilation is intended, with the plan oriented correctly on the wind rose.
  - **Next-Use:** illustration of architectural strategies that accommodate/trigger next uses of the building; its complex adaptability
  - **circulation:** primary horizontal and vertical circulation paths. Indicate elevator location and elevator equipment rooms.
  - **life safety:** means of egress diagrams with maximum travel distances listed
  - **day/lighting:** strategy and system of capturing and channeling diffuse light. All daylight diagrams must include appropriate 2D and 3D solar path diagrams.
  - **Solar Control:** strategy and system for control direct light. All solar control diagrams must include appropriate 2D and 3D solar path diagrams.
  - **water systems:** grey water capture, channeling, holding system

- **The Building Envelope Section Perspective/Axon @ ½”**

- **Models:** the models must be very well crafted. Model photographs to be included in the submission below.
  - 1:50 (min.) Bas Relief Context Model: should be a “thick 2d” diagram of the building and site strategy
  - 1:16” (min.) Building Model: model of building and adjacent systems.
  - 3/8” (min.) Building Envelope Model: not just a section cut. Assembly sequence and systems must be evident in this model.

The deliverables (what is due on Monday Apr 11 for IBS):

1. Presentation drawings and diagrams, previous models
2. Post your PDF presentation and Building Envelope Section Perspective/Axon on the Blackboard IBS site (discussion, under “April 11 submissions”). Post only one file with your section name followed by your last names: “MOE_Lemon Donaghy”.

Only vector based drawings from CAD or Illustrator will be graded. NO pixilated images will be graded for IBS.

File Submission:

- All layouts should be generated using Adobe InDesign. This will make it much easier to compile everyone’s work into a single file for printing.
- Save all pixel images (renderings, photo collages, and model photos) with a resolution of 300 dpi.
All files should be submitted with a CD containing your InDesign file, a final PDF of your pages, and a folder titled "Links" which contains all of the images in your pages. This can be compiled easily by using the “Package” feature in InDesign which is explained below:

- Save your file. Then go to the File menu and click **Package**.
- A dialog box that says Printing Instructions will come up. Ignore this and press **Continue**.
- Type a name for the folder in which all your documents will be placed. Please format the name of this folder using your professor’s last name followed by the Last Name of each partner (ex. “MOE_Lemon Donaghy”).
- Choose a location for the folder to be saved (your Desktop is probably the easiest place).
- Make sure that you have **Copy Fonts**, **Copy Linked Graphics** and **Update Graphic Links in Package** are checked.
- Click **Save**. You should see a folder with this title now located on your Desktop. If you open the folder, you should see an .indd file as well as a folder titled “Links” which now contains all the images linked on your pages. Burn this entire folder onto the CD to be submitted and you’re all set!