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Construction Through Design: A Three-Dimensional Project Experience

Amy Crumpton and Robin Carroll

Abstract

PURPOSE

This semester long studio project was developed to introduce first year students to construction methods for residential design and to introduce the design process, focusing on programming, design development and presentation techniques. The semester was divided into two parts, the first of which was a group project: creation of a ¼ scale townhouse model using various construction methods and dimensionally accurate balsa wood lumber. The second part of the semester focused on creating a client profile and designing the interior for this client.

METHODOLOGY

One of the biggest challenges for introductory courses in interior design is enabling students to understand space in three dimensions. An equally challenging issue is creating interest and excitement in learning construction methods. In developing this project, both issues were addressed.

Part 1: Constructing the Model

Students were divided into groups of four students. Each group was given the “Identical Construction” Kit # 105. This kit was chosen for the construction methods included such as stairs, floors, walls roofs and platform and balloon framing methods and because it had interesting three dimensional design opportunities.

Four weeks of calendar time (approximately 16-20 hours of actual studio time) were allotted for construction of the model. Two-thirds of each class meeting was devoted to working on the model. During the other hour, the instructor lectured on construction topics such as sill and floor construction, wall and ceiling construction, doors and windows, stairs and fireplaces, and roof designs.

Part 2: Design of the Interior

Part two of the semester began with a handout of the project requirements (see Handouts section). The first task was development of a client profile including circumstances for construction of the town house. Students were encouraged to pay particular attention to the surrounding architectural context (i.e. where located and integration with the surrounding environment), and developing the client requirements. Students also selected a ‘theme image’ (at right) and descriptive project title to help formulate their design concept.

Students had approximately seven weeks (eight including spring break) to complete their design solution and presentation boards. They were allotted approximately 28-30 studio hours to work on this project. During this period, instruction continued on construction methods and expanded to include electrical, plumbing, and mechanical systems. Additional instruction was given to include techniques required for the final project submission including overviews of rendering, one point perspective, lighting design, board design, and sustainable materials.

SUMMARY

Students voiced an overwhelming support of the construction phase of the project through survey results. 100% of students recommended using this teaching method in future classes. The model was indispensable when we began to discuss ceiling treatments, perspective drawings, and building sections during the design phases of the project.

Completion of the design phase was also successful. Students kept a time log for the project and time spent on the project ranged from 100-150 hours during the seven week period. Final projects ranged from vacation cottages to downtown industrial themed spaces for young couples. Final project requirements may be scaled back for future semesters.
REFERENCES


Support Materials

HANDBOOKS

Project Images

Building the Model

Designing the Interior

Kit Information

Identical Construction Kit # 105. Each 1/8 inch scale, 2-story townhouse framing kit contains dimensionally accurate micro-cut balsa wood, cutting tools, measuring tape, layout pencil, nails, glue, custom miter-jig, instruction booklet, ten working drawings and a styrofoam work base. In order to facilitate group work, additional miter jigs, saws and instruction booklets were procured. This allowed each student in the group to be working on wall construction at the same time, lessening the overall time required for construction. Each kit is approximately $100 depending on the supplier. The kits were purchased with lab fees required for the class.
These kits are sold through the following suppliers (in alphabetical order).


Textbooks and sections reviewed

The following textbooks are required for this studio and subsequent studios. Listed here are the main topics and chapters covered during this ID Studio I course.


Chapter 10: Sill and Floor Construction
Chapter 14: Wall and Ceiling Construction
Chapter 15: Doors and Windows
Chapter 16: Stairs
Chapter 17: Stairs and Fireplaces
Chapter 21: Residential Electrical
Chapter 22: Information, Security and Security Wiring
Chapter 23: The Electrical Plan
Chapter 24: Residential Plumbing
Chapter 36: Residential Climate Control


Chapter 4: Drawing and Sketching Interior Environments
Chapter 5: Rendering
Chapter 7: Presenting Materials and Finishes


Chapter 7: Elevations

Chapter 8: Sections

Townhouse Project Part 1: Frame Construction of a two-story Townhouse Model

Project Scenario:

Working in teams of four, construct a Townhouse built of the materials as supplied in your kit. Each student will receive an instruction booklet and tools to use during class. Each team will receive a set of plans for house construction as well as the materials to complete the construction.

Project Requirements and Assessment:

After completion of the model, the instructor will evaluate the completed model for neatness in construction methods, use of materials and correct structural design. Students will also be expected to complete a vocabulary and construction exam as part of the assessment score.

Townhouse Project Part 2: Designing the interior for a specific client

Project Scenario:

These townhouses are being built by a developer in several parts of the country including both rural and urban settings. They have been shown to appeal to several demographic groups. In highly expensive urban settings they are affordable for upwardly mobile first time home owners and in rural areas, they are perfect for get-away cottages. As you create your town home, also develop a set of circumstances under which your particular townhouse is going to be created.

Project Requirements (see grading sheet):

1. Fill out the Client Information Worksheet. This will help you develop a story about the people who are going to live in this particular townhouse. The final 'story' should be less than 200 words and should be placed on one of your boards under the heading “Prospective Owner Profile.” You also need to select an image that represents the ‘theme’ that you will be working with.
2. Come up with a project title. Preferably more interesting than “A residence for the Millers”

3. You will design the townhouse with the following parameters:
   a. Wall layout and design – you can move non-load bearing walls and otherwise modify the structure (check with me about ability to modify)
   b. Furniture layout and selection based on your client’s requirements.
   c. Finish selection
   d. Electrical and lighting layout (fixture selection not required)
   e. Creation of a door schedule, window schedule, furniture schedule, and finish schedule
   f. Creation of two design sketches showing specific design elements
   g. Creation of grey-scale shaded longitudinal and transverse section through the house showing wall elevations, furniture and finishes as appropriate.
   h. Creation of three $\frac{3}{4}$"=1'-0" scale labeled diagrams of construction methods using pictures of your house construction and sketches.

4. Create six boards (mat board mounted on top of foam core) 15" x 20" in size. Place appropriate drawings, schedules and finishes together. Below is one option for creating the set of boards.
   a. Board 1: Upper and Lower Floor plan with door/finish/window schedules, Lighting and Electrical Overlay and Schedule, (1/4" Scale)
   b. Board 2: Upper and Lower Rendered Furniture Plans (black and white or color) with furniture schedule (1/4" Scale).
   c. Board 3: Two design sketches of the interior (rendered color or grey-scale), include the theme ‘image’ on your board
   d. Board 4: Sample and Support Board that coordinates with schedule, and include finish schedule on this board
   e. Board 5: Transverse and Longitudinal Sections (on plans) through the structure rendered in black and white/grayscale
   f. Board 6: Images of the model (color or black and white) with three $\frac{3}{4}$"=1'-0" sketches and labeled diagrams of the construction methods

5. Boards should be hand lettered, and all boards should have the project title, and ‘Board x of 5’

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Client Information Worksheet

<table>
<thead>
<tr>
<th>CLIENT INFORMATION</th>
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<tbody>
<tr>
<td>Client Name(s):</td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

<p>| Subject Property Address: |</p>
<table>
<thead>
<tr>
<th>Family Members, ages and interests</th>
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</table>

<table>
<thead>
<tr>
<th>PROJECT INFORMATION</th>
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</thead>
<tbody>
<tr>
<td>Design Focus Areas:</td>
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<td></td>
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</tbody>
</table>

| Client Preferences/Dislikes: |
| Colors, moods, etc. |

<table>
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<tr>
<th>Pets/Animals:</th>
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<th>Health Concerns:</th>
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