MIT OpenCourseWare
http://ocw.mit.edu

4.500 Introduction to Design Computing
Fall 2008

Designing Rain a Screen

Nov 18, 2008

Assignment #8

This assignment is due on-line Tuesday, Nov 25

The aim of this assignment is to build a rain screen for the outside of your house of ½ cedar (simulated) or plywood that will be painted. We will supply the ½ masonite for prototyping & ½ plywood for the full scale example, the prototype (this assignment) is due in class November 25th.

Houses are sided of shingle, vinyl, wood clapboard, cedar and cement fiber board known as Hardi board. You have been asked to design a unique siding set of plywood. The siding will act as a rain screen, not a water resistant surface. A rain screen is a surface on the outside of a building that resists the hard damaging forces or rain and wet snow. It is not meant to completely repel water there is a vapor barrier behind the rain screen to prevent moisture from getting into the building. The reason you have been asked to design siding is that traditional wood shingles and clapboards take a very long time to install. The hope is that you will design a fast simple way to side the building that looks great.
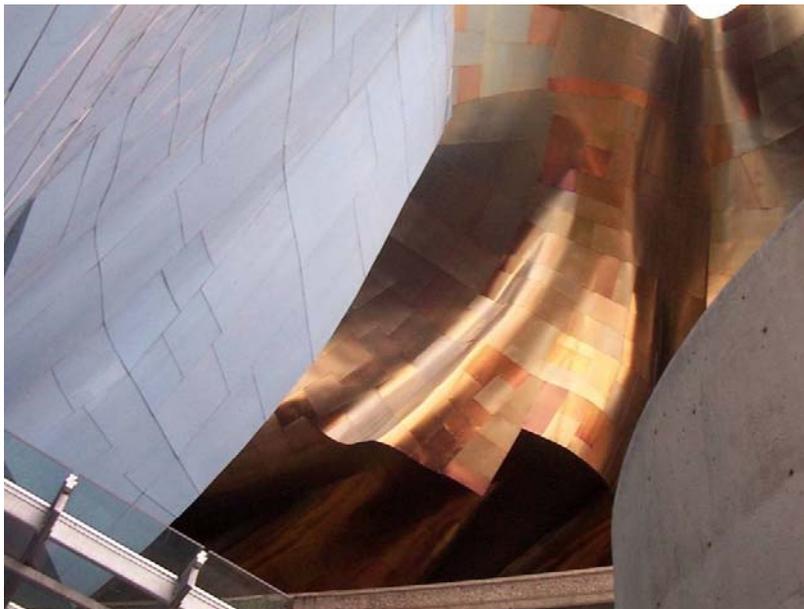
Figure 1 Frank Gehry's experience music project is lined with a rain screen.

CONCEPT

The design should one of stand alone components attached to the side of the building. Possible with this system is a 50 year material that can be held onto the side of the building by friction only. The screen will be attached to the ¾" frame you prototyped last week. Figure 1 conceptually describes the assignment process required to ultimately build a sample of the rain screen at full scale. Starting with the original model cut section 8' deep x 8'wide x 16' high then use that section as a skeleton for tracing a new abstract model from the cut building shape. Next, build a surface or set of surfaces that show where the sample originates. YOU WILL NEED TO INCLUDE A SIMILAR PROCESS IMAGE IN YOUR ASSIGNMENT TURN IN. The process image should show (1) the building, (2) the section, (3) abstract copy, (4) the rain-screen and the (5) sample area (2' x 4').
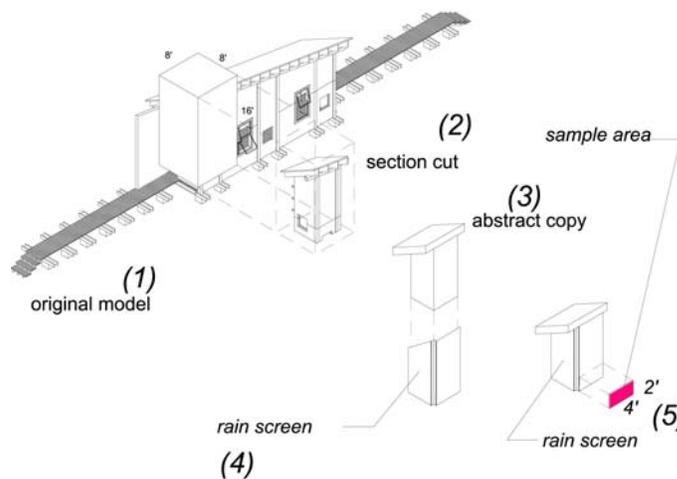

Figure 1. Process of reduction from starting building shape to CNC sample area

FILE PREP

Follow these steps to prepare the model

    a)   Create a copy of your model and rename the copy to suite the purpose. For example your original model should be lableled: lsass_cottage_original.dwg
        Your copy should be labeled: lsass_cottage_siding_prototype.dwg

        You may want to go back and re-label .dwg files based on the purpose of file.
            lsass_cottage_original.dwg
            lsass_cottage_3Dprint.dwg
            lsass_cottage_laser_cut.dwg

    b)   In real space make a box 8w' x 8d' x 16h' box. Use the box to find an area of the **roof** to build, best to find complex unresolved areas of the design (Figure 1)

            1   Command: "Slice" – Select area – choose yz or zx to slice.
            2   Create a boxed area around your model and erase all unused model material

DESIGN

The rain-screen should be of components either interlocking with the framing surface or bolted back to the frame. Friction fit is easier to execute in the field and cost less. Your job is to design a beautiful rain-screen as a checker board of parts.

1. It should look attractive – no ugly siding
2. It should be light weight – remove as much material as possible
3. Strength – strong enough to withstand a destructive child
4. Assures assembly between parts
5. Variation between panels – every panel does not have to be the same.
6. The edges should be different in design than the middle, depending on your design
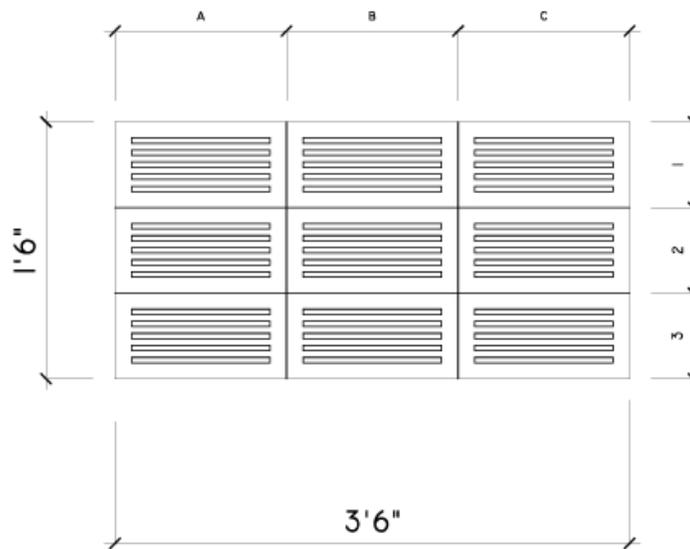

Figure 2 Pattern Design

ASSEMBLY

Design a common assembly for each of the 9 panels. The assembly should be very strong, spaced from the main frame enough to get your hand between the siding and the frame. For this assignment the backer board will be the same material as the 1/2" siding (1/8" masonite).
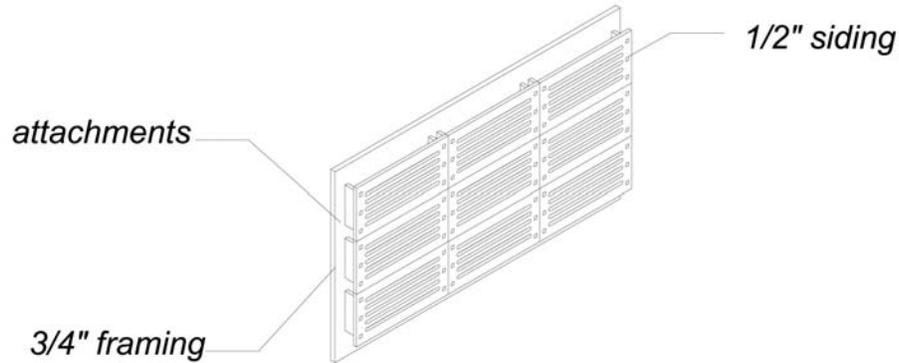

Figure 3 3D assembly of siding with backer board.

LASER CUTTING

Laser cut a prototype of the rain screen at 1" = 4" or 1/8" masonite - enlarged 4x equals ½" material for CNC cutting. This scale does not relate to the previous assignment. The siding should attach back to the framing or in this case a backer board.

PAPER TURNIN

Do not forget your name and assignment # in the page title block. You can use as many pages as you need.

1. The pattern as a 2' x 4' overall shape subdivided into 9 parts (See Figure 3)

2. One page illustrating the origin of your pattern (See Figure 1)

3. *The Cut sheet for the pattern lsass_cutsheet_08.dwg*

PHYSICAL MODEL

1. One laser cut assembly of 1/8 masonite – you may want to paint it. – BRING TO CLASS *or a photo of the model*