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4.510 Digital Design Fabrication  
Fall 2008

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## Assignment 5

Nov 3, 2008

*Ornamental Structures*  
*Prof. Larry Sass*

*The completed assignment is due in class and posted on Stellar, Monday, November 17 @ 2PM*

- "Access to the the waterjet is only 9m – 5pm Monday – Friday please plan accordingly"
- Yuchen will teach for the first assignment you will be responsible for the second assignment
- A waterjet session is 3 hours

### 1.0 INTRODUCTION

This assignment is a challenge in both problem solving and problem setting divided into three stages:

1 - THE WARMUP: The first part will challenge and teach you how to consider non-friction based connections between parts. The part does not have to be built of aluminum.

2 - ASSEMBLY SETS: Design a set of assemblies that will satisfy a field condition and all 9 corners of a wall. (Read: A Physical Grammar, Larry Sass).

3 - WALL: Build a wall of 9 panels from the designed assembly set.

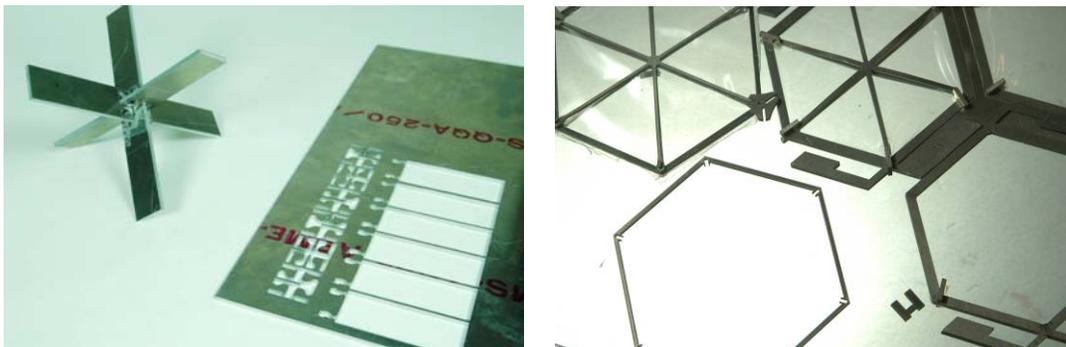


Figure 1 Metal model of interlocking parts and a 3D structure built of interlocking parts

### Metals

Provided two sheets of aluminum @ 6" x 10" x 1/8"

## 2.0 WARMUP ASSIGNMENT

- 2.1 Start in CAD with 3 slabs of material each slab is  $1\text{-}1/4" \times 8\text{-}1/2" \times 1/8"$  thick as shown in figure 2. Intersect the three slabs at their center (figure 3).

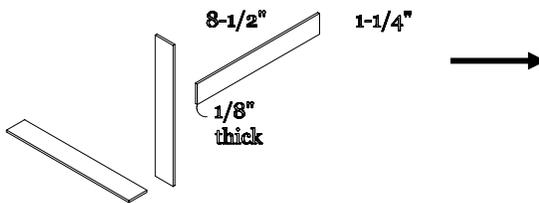


Figure 2.

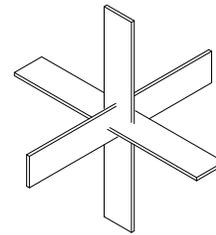


Figure 3.

- 2.2 Break the model into 9 parts, 6 legs and 3 center assembly components (figure 4). Create slots in the assembly of three center pieces each piece should slot into the other piece. Test the sequence of assembly cutting the 3 parts on the laser cutter (figure 5).

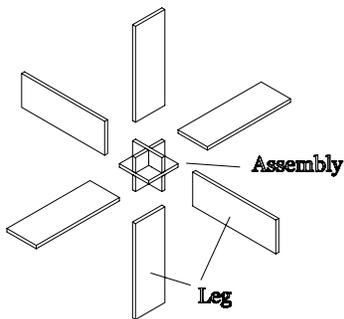


Figure 4.

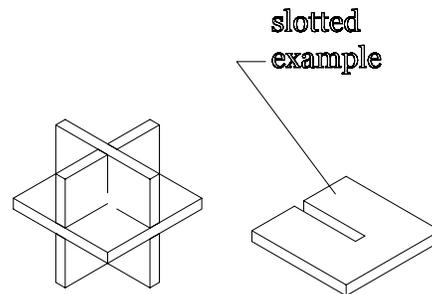


Figure 5.

- 2.3 Create a fix snap connection between the slotted assemblies and each of the 6 legs. Figure 7 demonstrates both slotted connections at the assemblies and snap or friction fit connects from the legs. "Don't forget to create a connection with your partner at this point before creating a cut sheet."

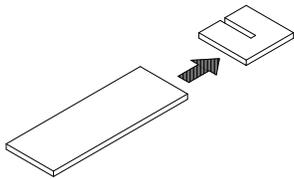


Figure 6

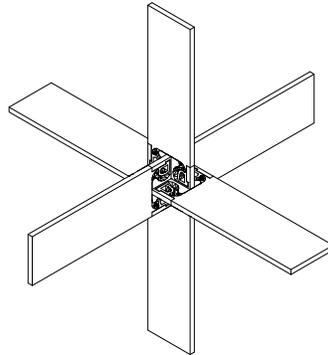


Figure 7

- 2.4 Build a cut sheet of the modeled parts, your stock sheet is 6" x 10" x 1/8". Using a profile command or redrawing command build a 2d drawing of the legs and assemblies (figure 9).

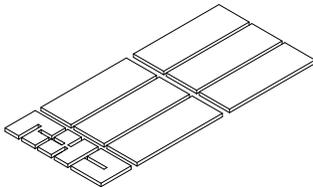


Figure 8

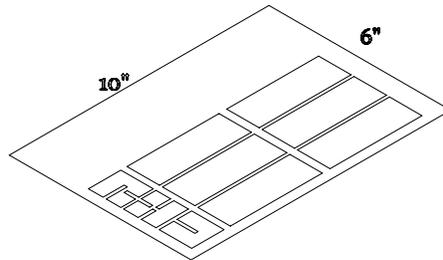
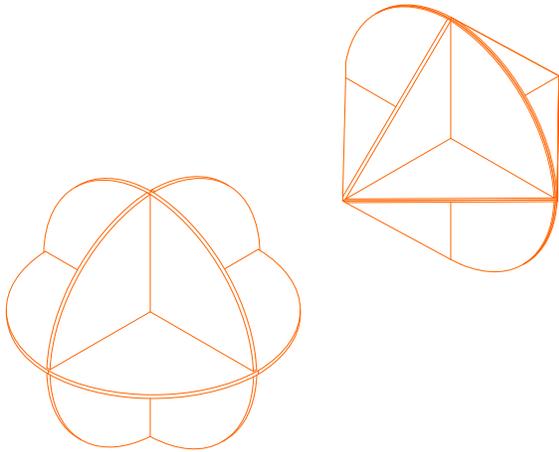
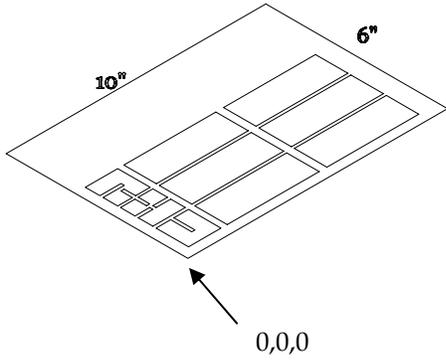


Figure 9

- 2.5 Tolerance parts according to connections points in very tiny increments, parts will not fit together without considering a tolerance factor at points of contact.

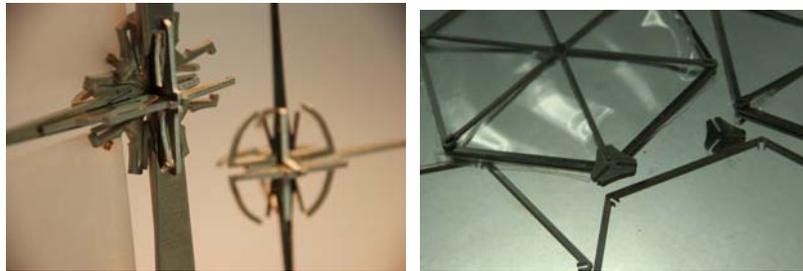
- 2.6 Output DXF file in INCHES ONLY. Make sure that your cut sheet is placed at the 0,0,0 of the lower right hand corner of the cut sheet. Open the Omax tutorial follow instructions.



### 3.0 ASSEMBLY SETS

3.1 Assumed is that you have built a structural shell or set of surfaces as a solid model. The surface of the model can be porous, it should not have a solid core. The structure should follow the shape of your design if the current design is complex you should remodel to simplify.

3.2 Design one general assembly connection you think will satisfy most assembly situations. It should be repeatable.



### 4.0 WALL ASSEMBLY

4.1 Design a wall to include a nine square section that allows for variation in the some of the assembly to challenge the design. See fig 9. in " A physical grammar": Larry Sass for better understanding of 9in. Design a small set of assemblies with options for variation, prototype them then cut them to test for tolerance and neatness.

- The connection to the ground
- Connection to the right and left members of the walls
- Connection to the roof



## 5.0 GRADING CRITERIA

- |                                 |     |
|---------------------------------|-----|
| 1. Design sophistication        | 30% |
| 2. Relationship between parts   | 10% |
| 3. Fabrication efficiency       | 30% |
| 4. Quality of structure objects | 30% |

## 6.0 SUBMITTING PROCEDURE FOR STELLAR

UPLOAD: PDF

**November 17, 2008**

- a. Name, Date, Assignment #
- b. Sketches of Design Intent (scanned)
- c. Image of Design Models (Axonometric View)
- d. Digital Photo of final figure
- e. Brief answers to questions  
[3 Page max per exercise – 9 -10 sheet total]

CLASS TURN IN: Printout PDF. Leave in Office Mail Box in the Mezzanine

PLACE: Leave your models on the Metal Shelf in Fab Lab 1