



Materials in Design
Student Material- Week 5
Lab 3- Manipulation of Sheet Materials (Styrene Model Making)
Fall 2015

Background

Prior to the advent of the Industrial Revolution, and mass production, model making was limited to carving wood, bone, paper and simple metal cast from molds. With the invention of the Injection Molding Machine (invented in 1872 by the Smith & Lock Company) and cellulose acetate plastic (produced in 1919 in Germany), a whole new era of model making capabilities arose. Polystyrene (styrene) plastic (perfected by BASF in the 1930s) became the dominant form in which model kits were made. This bendable and glue-friendly material can be created in sheet form, much like paper, in various thicknesses. Additionally, styrene can be manipulated in many ways. It can be cut, sanded, glued and painted. Styrene can also be formed into various shapes using heat and vacuum.

Team Formation: 2 students [Please form new pairs]

Objectives of this Lab

This lab will prepare you to:

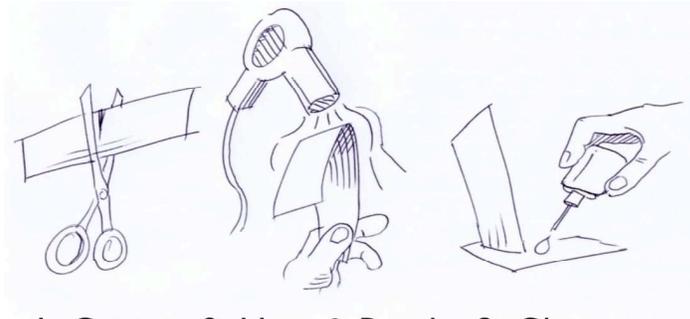
1. Create and cut stencils using styrene
2. Assemble styrene parts using solvent glue
3. Create complex shapes using heat gun and hand-bending
4. Optionally utilize pre-formed styrene shapes (e.g. coffee lids) in a different means than originally intended.
5. Use ideation/sketching for design development process

Steps to Follow:

1. **As a team, you will create at least (two) of the four following models using styrene sheet and tube. You may also use a found styrene object e.g. coffee lid as one minor component (optional)**
2. **Each team member must sketch out the product ideas on minimum legal-sized paper before building the model.**
3. **Model Types:**
 - a. **Pen/Pencil Holder** (rests on desk and holds at least five writing utensils)
 - b. **Business card holder:** Sits on desk and holds at least 10 business cards
 - c. **iPhone/Cell phone stand** Sits on desk and must hold iPhone in vertical or horizontal format. You must also consider hold for USB/charger cord.
 - d. **Thumbtack, paper clip & post-it note holder.**
4. **Requirements:**
 - Use knife to cut and shape desire components
 - At least one surface must utilize heat bending



- Composed of at least two physical parts joined by adhesive.
- **Techniques:**
 - Painting or marking (e.g. felts) of surface is NOT allowed.
 - Sandpaper block: Use this to create clean and smooth edges.
 - No other added materials e.g. string, foam, rocks, decals allowed
 - Do not substitute other plastics- please use white styrene



1. Cut 2. Heat & Bend 3. Glue

5. **Other Considerations:** Size of model should not be bigger than 5 inches (wide) by 5 inches (long) by 5 inches high. Not smaller than 1.5 x 1.5 x 3 inches high.

Deliverables: 5% of total course mark. [DUE in lab week 6 at beginning]

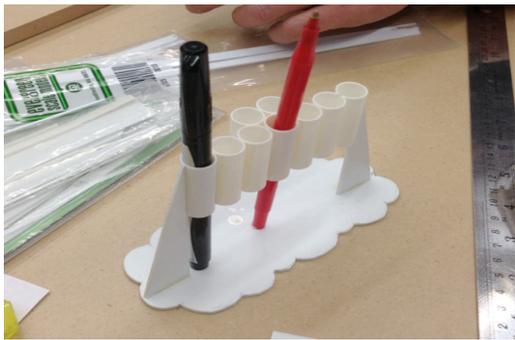
1. Completion of two models in styrene per team.
2. Two 11 x 17 sheet or similar with hand-sketches for designs (one per team member)
3. Models will be graded on creativity, practicality (functionality) and modelmaking (quality, workmanship, accuracy, tidiness)

Cool Resources:

<http://ultrawerke.blogspot.ca/2007/03/scratchbuilding-tutorial-part-i.html>

Next Steps:

- In our lab next week, we will be looking at resin casting.
- Please bring a small toy to mold.



Images: Snaphow.com