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4.510 Digital Design Fabrication
Fall 2008

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Term Project

Mass Customization
Prof. Larry Sass

The final for this project is due Dec 18th at 2PM (WEDNESDAY)

- You can work in groups of 2!!

1 Introduction

The first section of the course was focused on skill building and design delivery of small products with digital manufacturing. Exercises started very small concluding with a moderate size 3D artifact (a chair). The process is referred to as materialization. For the second half of the course we explore one method of design delivery using digital fabrication and a building based materialization process. For this there will be 5 exercises leading up to a final error correction model and a component mockup.

Assignment Criteria

- Product A Taxi Water Station
- Material Aluminum & Glass
- Assembly Snap Fit connections
- Tool Water Jet Cutter

2 Water Taxi Stations

The final product will be a design proposal/research paper illustrating the design and science of your proposal. The design focus is on the look and function of the structure, the form must be interesting and clearly a product of the Boston scene (as the designer will define what this means). Next and most important is presentation of your developed production science that will allow you to:

- a) Design new versions of the Water Taxi Station with ease and share the designs electronically with all trades.
- b) Manufacture each design using three distributors of sheet goods and CNC manufacturers [Karis & Karis Sheet Metals, Tri Pyramid metals & Altec Plastics).

3 The Problem

Water taxis, mostly found in the area around the Aquarium use too much space to sell tickets and enter each taxi. The ticket booth is on the level of the cars and buildings. Entry to each the water taxis are in separate locations. The city would like to see the booth and taxi approach ramp as one solution. This will enable the city to sell more taxi space to new companies and space for new businesses interested in tourism.



4. Mass Customized Products

Boston Department of Transportation has issued a request for proposal for the design and delivery of ten water taxi Stations throughout the Boston Harbor. You are responsible for the first 2 stations the city will manufacture the remaining 7 taxi stations over 3 years. The city is as interested in replacing old stations as well as building a new. The station must be designed as a product that is replicable, very low cost and architecturally exciting. Each station will be different no two water taxi stations will be the same however the cost and manufacturer must be the same. This project is a great example of the need for *Mass Customized* products.

- a) Each taxi station will differ in design and it must be of the same size and cost
- b) The design will vary due to location and site constraints, but the size and cost can not.
- c) The stations base structure (piers) will be provided by the city of Boston

5. Precedents

A great example of small structure **design** is by Reiter & Reiter in 2003 as a small entry booth for the De Cordoba Sculpture Garden in Lincoln Ma. This small structure is formed of coated sheet metal, the shape is influenced by the curvature of the road and the surrounding garden. The form that has an interesting night time lighting scheme is intersected with a glass volume for the ticket clerk. The form is simple but the delivery is not. Alternatively great example of small structure **delivery** as a business is the company Wall (<http://www.wall.de/>) who manufactures and maintains Boston's bus stations. They claim to repair a damaged structure within two days. They can manufacture and deliver a high quality bus stop in days, however the design is fixed and not that interesting.



Figure 1 Entry booth at the De Cordoba Museum in Lincoln MA.



Figure 2 Wall Street Furniture

6. The Process

The project will explore 3 model types in 5 weeks from prototyping to error correction models and mockups. The first project site is adjacent the ICA building in South Boston. Water taxis leaving from this station will take tourist and museum visitors to the Aquarium and The Science Museum. The process is listed below:

Week 1	3D printed Prototype
Week 2	Construction Languages
Week 3	Construction Modeling
Week 4	Mockups
Week 5	Error Detection & Correction Model
Final Presentation	

8. The Presentation

Design Review Dec 18th 4PM – 7PM

You are expected to present all 4 models and evaluation notes for each design study to 2 reviewers as a powerpoint and physical presentation (later uploaded to stellar). The final grade will be based on points for each study and the final, 100 points maximum. You will have 10 mins to present your project and are allowed to present a maximum of 10 slides:

1. Introduction – name, images of final design, etc..
2. Design Study 1 - *Prototype Model*
 - a. **[5 points]** photo of design scheme in model
 - b. **[5 points]** physical models
3. Prototype Reflection Notes **[15 points]**
4. Design Study 2 – *The Construction Language (Water Jet)*
 - a. **[5 points]** photo of design scheme in model
 - b. **[5 points]** physical models
5. *Construction Language* Reflection Notes **[15 points]**
6. Design Study 3 – Error Detection & Correction A Model (*Water Jet*)
 - a. **[5 points]** photo of design scheme in model
 - b. **[5 points]** physical models
7. Prototype Reflection Notes **[15 points]**
8. Design Study 4 – Digital Mockup (*Water Jet*)
 - a. **[5 points]** photo of design scheme in model
 - b. **[5 points]** physical models
9. Prototype Reflection Notes **[15 points]**
10. Conclusions – The proposal

- Print out the powerpoint for a grade
- Upload power point as a PDF to stellar