

## Project 4 – Describe and Make a well-known design detail

Assigned: Monday, March 19

Due: Wednesday, April 4

### Abstract:

Now that you have had some experience and time to explore CNC fabrication and machine techniques, we will expand our research to involve more particularized objects of design intention. This assignment asks that you first *describe* then *make* a detail from some well-known artifact of design.

You may choose any realm of design, and virtually any detail from it, but it should be something well documented and of critical interest to the class. Possibilities include:

#### Architectural

- furniture and furniture details
- hardware (doorknobs, handrails, fastening devices, etc.)
- unit systems (concrete block, wood panels, etc.)
- cladding devices
- formworks (castings...)

or propose ideas from outside of the architectural world – past projects include:

- clothing and clothing parts (buttons, handbags, etc.)
- automotive parts
- cutlery, vases, lamps and other decorative arts

The object(s) should be something already designed and built, not something of your own design (we'll get to that later). You should be able to find both drawings and photographs of the object to work from.

### The Task:

There are two parts to this project, and I suggest that you get started early.

*1 – Describe the object.* Before you can fabricate your object, you must be able to describe it concisely. As we have discussed in class, the description of an object can be one of geometry, or one of process. Both are of equal importance to our understanding. Your description should be as complete as possible, but also as thoughtful as possible. In many cases (perhaps most), your description should not simply be of the object's geometry, but also of the process that will be used to make it. These two descriptions may require different software and different approaches. Recall our discussion of feature-based design, where objects are described through processes, not geometries. You might, for example, describe a hole in an object as a drilling (plunge) operation (CAM) rather than as a cylindrical void within a box that has been constructed geometrically in CAD. The first case describes the process, the second only the result.

As part of your description, consider also the complete process of making, including any secondary processes that might be used. This could include castings from a negative mold or the stretching of a skin over a milled/routed/3D printed surface. Consider also that several two-



dimensional shapes (through the laser or router) can be brought together to build a more complex three-dimensional form. Such secondary processes greatly increase the possibilities afforded by these otherwise limited machines. This is very common in industrial fabrication. Rarely is only one machine or process used.

2 – *Make the object.* Once you have a concise description of geometry and process of making, proceed with its fabrication. Use the tools that we have learned in class to either cut, print, mill, or rout your pieces, and work with these tools to optimize upon its performance. Do not simply throw the object at the software and let it do its thing. As we have seen, this may not be the most appropriate or efficient path. Work with the software as a tool to most effectively setup the proper procedure for fabrication. This will likely include multiple passes in both rough and finish work, and likely multiple tools. Choose your tools and machining strategies wisely, and consult with me when you have questions. These will still be experiments, just with a little more focus of intent.

You will most likely also make mistakes, and the manufacture of your part will require several iterations. Plan for this and leave enough time to try out a few things along the way. Even setup a few machine trials on your concepts up front to test the feasibility of your descriptive approach. Fabrication does not always have to come after description...

### Special Considerations:

**Materials and Scales** – The focus of this assignment is to work at, or as close to, one-to-one scale as is possible. This includes material where this is possible and economically feasible. We are not building models of the objects. We are building the objects themselves. If material substitutions must be made, try to choose a substitute that mimics the real material's core properties as closely as you are able. If you must modify the scale, keep it close to real scale – 1:2 or 1:3 ratios, or similar. Do not work in model scales (1/4" = 1'), as they are only representational and materials will not respond the same way.

**Complexity** - Do not take on too complex of an object or idea. Keep your investigation rather simple and straightforward such that you may concentrate your efforts more on the process than on the intricacies of the geometry that you are trying to make. Working with the complexities and intricacies of the machines can be time consuming and frustrating enough. You will learn much more from a simpler and focused study than you will from an overly complicated attempt to make a beautiful object.

### What to turn in:

For in class discussion, bring:

- Your final object(s).
- A printed description of your geometry / process.
- Iterations that you went through, both physical and procedural, as appropriate to describe what you did.
- Photographs and/or drawn documentation as found in the library or other sources.

To keep you moving smoothly, I would like everyone to email a description of his or her chosen object to me by the end of this week. I will be available for consultation throughout the week.