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Architecture of materialism: A study of craft in design culture, process, and product

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Architecture of Materialism: A Study of Craft
in Design Culture, Process and Product

by

Logan Mahaffey

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Architecture
School of Architecture and Community Design
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University of South Florida

Major Professor: Steven Cooke, M. Arch.
Stanley Russell, M. Arch.
Mark Weston, M. Arch.

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Architecture of Materialism: A Study of Craft in Design Culture, Process, and Product
Chair: Prof. Steve Cooke

by Logan Mahaffey

DEDICATION

This thesis is dedicated to my parents, for their love and support. Sorry Rach, you didn't make the cut.

ACKNOWLEDGEMENTS

I would like to acknowledge my chair, Steve Cooke and my committee members, Mark Weston and Stanley Russell for their guidance and support throughout this thesis.

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Architecture of Materialism: A Study of Craft in Design
Culture, Process, and Product

Logan Mahaffey

ABSTRACT

It is estimated ten thousand hours of experience are required to master any given process (Sennett 20). Whether it is wood joinery, music, culinary arts or weaving, it is about making something that can be seen, heard, touched, and/or used. Society seems to be losing an appreciation for craft as an idea. Especially in the US, materialism has reduced quality and craftsmanship to merely a luxury to those that can afford a \$10,000 Maloof chair or an \$8000 Amish table. Developers build for maximum profit while buyers seek maximum square footage. Yet it seems while mainstream society continues to “progress”, the craftsmen see their clients loss comprehension and appreciation of true quality in their workmanship. While many schools and guilds around the country aim to keep “the crafts”, i.e. material-based mediums alive, each craft brings potential processes and applications to the architectural realm. While the architect’s general role is to be the conductor of these mediums, he should also study them as a source for potential material and building processes. The art of boatbuilding, glassblowing, ceramics and others each hold something unique to be implemented into architecture. While it is not yet clear what this thesis will turn out to be, as far as program or building type, the goal is the study of craftsmanship of all the different arts and how it can be translated into an architect’s design process as well as his product.

INTRODUCTION

Architecture of Materialism

Behind every well-crafted joint there is a craftsman who made it. It is estimated ten thousand hours of experience are required to make a master carpenter (Sennett 20). The same goes to musicians and chefs and others. There is much to be learned from craft itself and crafts throughout history, from joinery, boat building and furniture making to the culinary arts, music and dancing. This is a study of craft, the craftsman, and his workshop. In architecture, it is a study of craft in an architect's design process and craft in his product. Architecture is a discipline where thought should be put into every detail.

Sadly, appreciation for craft seems to have dwindled in society in past years. More and more people simply cannot comprehend true quality or craftsmanship nor do they care to. The connection between maker and user has been severed due mostly to the consumer-driven culture we live in today (Sennett 14). Quantity over quality is now a way of life. This is tremendously apparent in the architectural realm. The idea of having a well crafted, well constructed building has become somewhat forgotten or deemed somehow unnecessary. Obviously, developers are notorious for building low quality structures putting no care into detail or materials as a means of additional profit, but they may not be the only culprit. The view of what a well crafted building is has changed in the eyes of the typical consumer. Before craft in architecture, an understanding of craft as an idea as well as "the crafts" i.e., medium based disciplines must be established. The dictionary definition for Craft is; an occupation, trade or pursuit requiring manual dexterity or the application of artistic skill. This is somewhat generic, and obviously there is more to it than that. Craft is far broader than skilled manual labor, it is an attitude towards what you are doing. It is putting care, in any discipline, into what you do. Whether it is making a chair, a photograph, or a software

program, it is basic human instinct to have the desire to do the job well for its own sake. In *The Craftsman*, by Richard Sennett, he describes different situations in culture where society is affected by craftsmanship and vice versa. An example of this is in Soviet Russia, where workers were demoralized by the first of the two modern world's "recipes" for attempting to arouse the desire to work hard and well. The two recipes are, as Sennett states, the moral imperative to do work for the sake of the community and competing against others provokes the desire to perform well. With regard to housing developments surrounding Moscow, the signs of poorly motivated workers appeared in the details of construction. Window boxes and planters were left bare. The construction workers took no care into what they built and the residents were indifferent towards what they inhabit (Sennett 28). More close to home, the modern era indeed offers tremendous possibility and in terms of professional promotion and financial success. Yet so many people seem to be stuck in careers that are mind numbing, unrewarding work, whether dead end or not. These workers see little or no positive or incentive in the work they do. Unmotivated workers receive no pride in what they accomplish and, in turn, impair both understanding and expression of craftsmanship. An example of this is low end jobs in the corporate sector, where no true skill is needed to accomplish what the worker is tasked with. The worker never sees the fruit of his labor the way a "craftsman", such as furniture maker or a potter, sees his final product. These craftsmen deal with "the crafts", being medium-based disciplines, such as woodworking, ceramics, metalworking, glassblowing, etc. It is what people have come to envision when thinking of a craftsman. The skill and expertise these workers boast allows for more thought while they labor and are in turn more problem-attuned. At a high level of skill, the craftsman's technique is no longer simply a mechanical activity.

The craftsman can think fully and deeply about what he is doing (Sennett 20). While the layperson sees a sturdy, beautifully made table, the furniture maker sees the minutest imperfections which he must correct to maintain his integrity and pride. He is no longer concentrating on the technical process; he is beyond it in thought. Unlike his early American counterpart, who worked by hand out of necessity, the modern day woodworker has chosen his craft deliberately as a means of pleasure and expression and in response to a personal sense of need (Renwick 3). To put this into perspective, the work of true craftsmen must be acknowledged. In furniture, the names George Nakashima, Sam Maloof, or Art Carpenter may sound familiar. American born Nakashima, a trained architect of Japanese descent, spent years in France, India, and Japan working with architects, woodworkers, and carpenters to learn their methods. Upon his return, he compared common architectural practice here in the US with the careful methods of Oriental building and unfortunately decided architecture could not be his lifework. Instead, he resolved to "get into something that I could handle from beginning to end". Believing that design in architecture and furniture begins with materials and structure, and that design is proved in the making of the thing. He felt that as a builder of furniture he could maintain his standards of design and craftsmanship (Renwick 6). Sam Maloof, on the other hand, was never an architect. More or less self- educated, he was gifted in the art of woodworking. In an interview, Maloof stressed the importance of hand-crafted furniture, where the designer is the maker and where he can make changes when something isn't right. He compares this process to the idea of machine-tooled mass-produced furniture, where the designer is very much separated from the craftsman, and where the user is just as separated from the maker (Renwick 12). Art Carpenter, also never formally trained in woodworking, is another prominent figure in the art of furniture design. Well known for his free spirit, Carpenter

couldn't justify the time involved in making hand-cut dovetail joints and invented a technique to cut dovetails with a router and a shopmade jig. His impatience led to fitting drawers using his own technique for cutting them from solid wood with a bandsaw. This innovation was the precursor to the bandsawn box (Renwick 30).

A woodworker's appreciation for wood is the same as a potter's appreciation in clay. These craftsmen were known for their skill and control of process. Nakashima, an architect before a woodworker, put the same effort in his architectural practice as he did his woodworking. His work, while in the office of Antonin Raymond, on the dormitory at the Sri Aurobindo Ashram in Pondicherry, India exhibited his craft of design and building. Photos taken for an exhibition 60 years after completion illustrated the amazing quality of the architecture, its detailing and craftsmanship, and its site integration. Notably, it was the first reinforced, cast-in-place concrete building in India and went through a lengthy construction process plagued by inexperienced workers, political unrest and impending world war. More current, architects such as KieranTimberlake take a fresh approach to the design process. KieranTimberlake, based in Philadelphia, house their own material and methods research facility.

“We have absolutely no interest in the process of architecture for the sake of process itself. What motivates us is the art of architecture - the making of beautiful buildings that elevate us all through the fusion of purpose with place, craft and ethical design. For us, this aspiration requires control, deep control, the ability to consistently and insistently translate idea into form, intention into substance. Our drawings depict intention to the fabricators and builders who then give form to the intention. Most art is about the controlled translation of vision into

form. The problem today, however, is that this ideal of controlled translation is under assault. The forces that have collapsed upon architecture and conspire against control are many. They include cost (value engineering), schedule (time), quality (punch list) and fabrication strategies. A graph of productivity in design and construction since the 1960's portrays a distressing tale that continues to undercut the prospect for deep control. The story of declining productivity in architecture and construction is without parallel in modern times. While nearly all other fabrication has gained productivity, building activity remains alone in a declining trajectory. Cars are today unquestionably better than they were just fifteen years ago, while the cost and time of building architecture has increased as the quality and scope decline. With each cycle of declining productivity, the loss of control understandably deepens" (Kieran Timberlake 4).

They go on to perception of "practice of architecture" is just that, practice. Medicine, law, engineering and architecture are coupled with the world practice for a reason; they are not perfect. In the Loblolly House, begins to explore and develop the craft of prefabrication and method of assembly in architecture. The house is elevated on pillars and rises to two storey modulated structure. They decided the practice of typical "prefab", factory-built, trailer-transportable architecture could not be justified because of the site, location and scope. Instead the pillars of the house were placed rather vaguely and as the home was raised it would become more and more accurate to a point where factory-built panels and a Bosch aluminum scaffold system could complete the home. From the platform of pillars, the entire house was erected in less than six weeks with relative ease and accuracy with mostly a wrench rather than a hammer (Kieran Timberlake 2).

As Kieran and Timberlake wrote, the goal of the architect is the product, not the process. Understandably, architects cannot do the job by ourselves. We are obligated to our consultants and collaborators to accomplish the task at hand simply because an architect cannot possibly master all the processes and means necessary to realize the job. Even AIA contracts explains our role as first the designer, and second the controller (Kieran Timberlake). Another architect currently practicing successfully with collaborators is Tom Kundig of Olson Sundberg Kundig Allen Architects in Seattle, Washington. Contrast and tension between inventiveness and refinement, elemental and exquisite, intuitive and super-crafted, can be found most clearly in his houses. He is well known for what he calls “gizmos”, which are the mechanical devices in his various projects that turn static architectural elements into those with dynamic movement, often with direct participation of users. Two of his most well known gizmos are at the Chicken Point Cabin and the Delta Shelter, where hand-cranked mechanisms that transform the spaces by opening massive windows or walls (Thompson 47). He understands he cannot accomplish the task without the knowledge of his collaborators. Phil Turner, whose background is science exhibitions and kinetic architecture, made him the ideal collaborator in these projects. Kundig knows both he and his collaborators must be willing to learn from each other. He sketches out his idea of what he wants, draws an arrow leading words like “frankenstein bolts” or “bag o’ sand” and gives it to the collaborator to get his input. Kundig’s approach, being somewhat comedic, relies on his colleague’s knowledge to complete the job. He does not attempt to design objects he knows he cannot design well by himself.

What more can be taken from the design process of these architectural practices and these crafts in general? Whether contemporary or not, studying these crafts is the starting point to bringing new processes to the table. Limiting research to only the architectural realm would obviously be narrow-minded, for there are masses of information, techniques, and processes

what this thesis will turn out to be, but a significant amount of thought and effort must be put into research on the topic of craft. The final product will be the result of the process. Everything studied thus far should be re-examined, such as the medium-based disciplines like woodworking as well as the current culture of craft and societies view of it. Schools such as the Penland School of Craft as well as modern guilds like the Southern Highland Craft Guild will be examined in an effort to have a different perspective on these topics. The interest and drive of this thesis dwells in the pursuit and preservation of things well-made, well-crafted, and well-thought.

PRECEDENTS

Penland School of Craft

Located in the Blue Ridge Mountains 50 miles outside of Asheville, Penland has been a center of craft education since the 1920's. Originally founded as an association to teach the craft of weaving to local women as a way to give them a source of income, Penland has moved on to teach both men and women the crafts of glass, clay, metal, wood, textiles, print, photography, and drawing. Over the years, many well known artist and designers have come to Penland as visiting professors and resident artists, including Sam Maloof.



Fig. 1. Penland School of Craft

NW School of Wooden Boat Building

Located in the small town of Port Hadlock, Washington, the school helps to preserve the rich maritime heritage of the area. Since 1981 students have come to learn the methods and practices of quality wooden boat building, including drafting and design, lofting, lapstrake construction, sail making, rigging and many others. The school offers both short term summer classes and 6,9, and 12 month degree programs. Instructors have year of experience in the craft and to provide an intense hands-on learning environment.



Fig. 2. NW Boatbuilding

Center for Wooden Boats

Established in 1981 on the South shore of Lake Union in Seattle, the Center for Wooden Boats aims to preserve small craft heritage to future generations. The center acts as a museum but also provides a venue for sailing lessons and a place to restore wooden boats. The collection includes over 100 boats, mostly small sailing and rowing vessels. In 2008, the CWB opened a second campus at Cama Beach State Park located about 90 minutes north of Seattle. They operate year-round providing boat rentals, classes, and events.



Fig. 3. Seattle CWB

Sam Maloof



Fig. 4. Rocking Chair

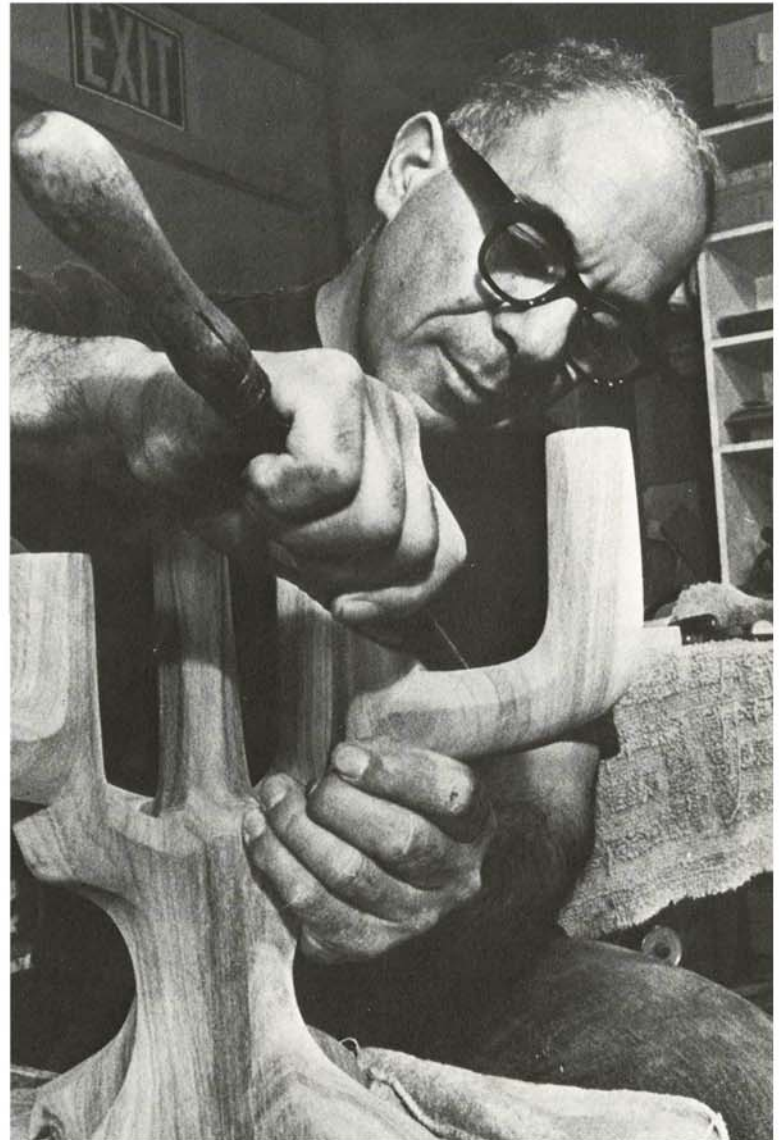


Fig. 5. Sam Maloof

Art Carpenter



Fig. 6. Band Saw Box

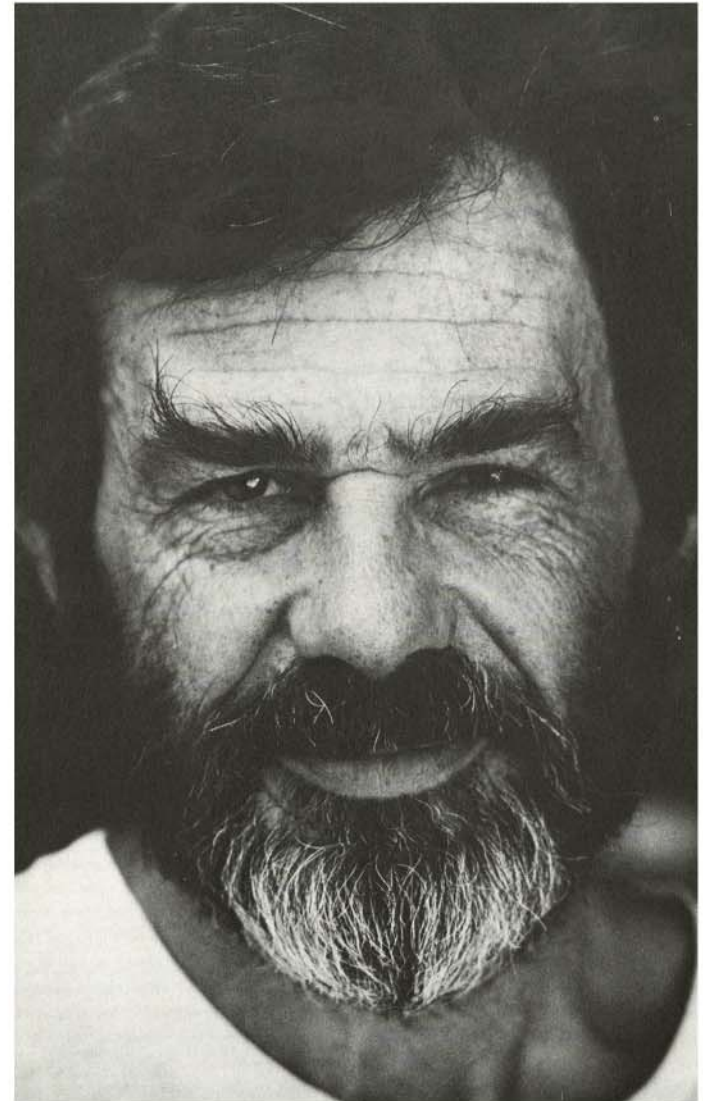


Fig. 7. Art Carpenter

George Nakashima



Fig. 8. Bench

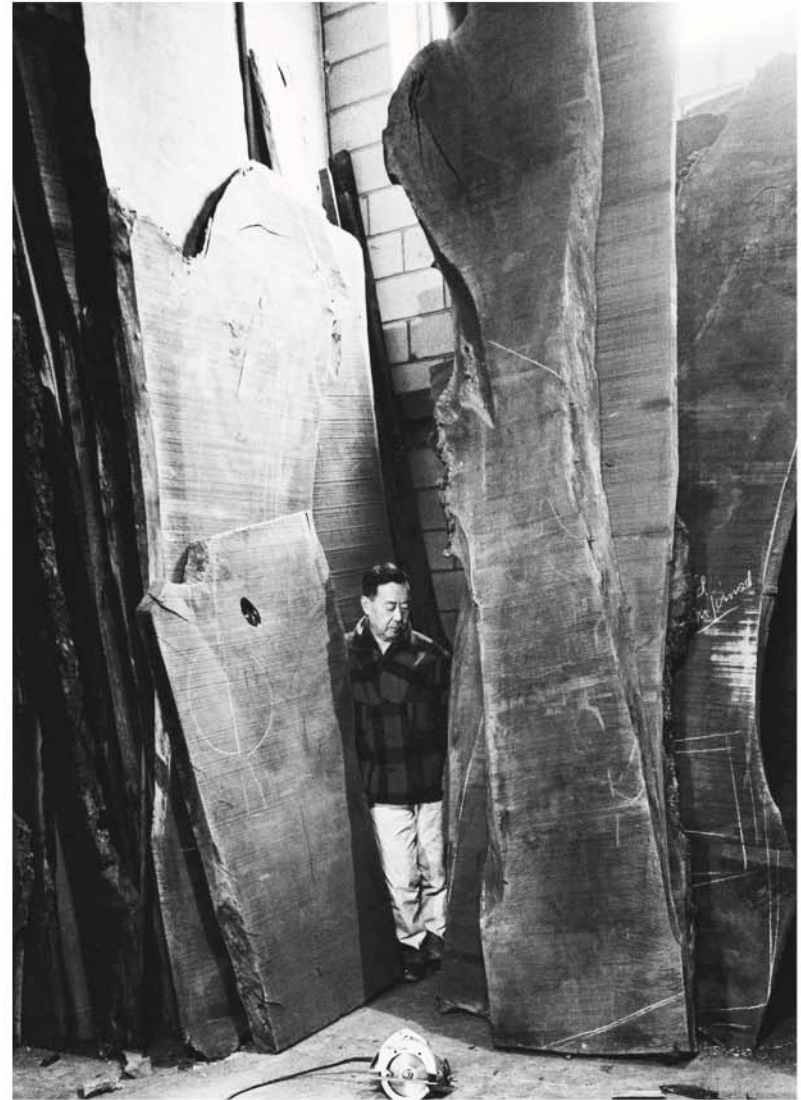


Fig. 9. George Nakashima

Furniture Designers

The work of Sam Maloof, George Nakashima, and Art Carpenter, to some degree, represent an attitude of craft happening throughout the United States. Most who have heard of these furniture makers know they will, most likely, never have the opportunity to possess one of these pieces because of their rarity and cost. While these works have a study of craft in themselves expressed to joinery, hapticity, and process, they also share the limelight of quality in furniture making. On a recent trip to Seattle, I wandered into a high end furniture store that had been established in the early 1900's. I asked the salesman if he had any Maloof chairs for sale or on display. Pointing to another chair he simply replied "I wish, but he did stop in here once and sat in this chair." As I left I couldn't help but wonder how this man, who is still alive, somehow acquired celebrity status in a profession like woodworking. Original Maloof chairs currently sell between \$10,000 up to six figures, even knockoffs can sell as high as \$8,000. In an interview in 1972, he explains how he will only use a linseed/beeswax finish on his pieces. Admitting the practice is somewhat archaic, he continued in saying all the newer wonderful finishes on the market won't give you the same feeling of linseed/beeswax. Using linseed/beeswax, it forces the owners of his pieces to periodically re-apply and care for the furniture. "It gives the owners an opportunity to know the furniture they buy from him." In the same interview, he talks about a topic that will certainly play a major part of this thesis, innovation and process to perfection. He tries to introduce a few new pieces a year, but he does re-make his well known pieces to different clients. He sees very subtle things in his original designs that he thinks should be improved but is very careful to keep the original design. This forces me to begin thinking of another aspect of craft, hand-made vs. mass-production. Maloof obviously does not believe in the latter, for he is not only the designer but the maker. He admits he never works with drawings before he begins a project, he

just starts building and thinking. Concerning craft, mass production can be problematic. We all have had experience using poorly made objects produced in a factory, but some high-output manufactures can still produce quality while still making profit. In terms of furniture, I think of Knoll and Herman Miller. These companies' have been known since their founding to hire good designers and skilled craftsman to reach their final product. Unfortunately, even these companies' have, over the years, inflated their prices because they have now made a name for themselves. Maloof probably has had some pretty decent offers on the table to sell his designs, but so far he believes in his own hands. Affordability is a key factor in hand-made vs. mass-production. Perhaps something can be designed to be easily re-produced yet still hold on to the quality and craftsmanship found in more expensive objects. Hand-made is expensive because the client is paying for the hours of a skilled labor needed to produce the piece. From here I need to look into manufacturers like Knoll and Herman Miller, even Eames and other designers who have sold the licensing to their designs. Also, the contrast between innovation vs. a process to perfecting an established design needs to be dealt with, especially in to architectural profession.



Fig. 10. Leg Splints

Ray and Charles Eames

Between 1941 and 1978, Charles and Ray Eames created their great modern furniture "classics". In their later years, they specialized in armchair design combining technology, organic form, and new materials. Unlike Maloof, they designed for the masses. Their pieces were intended to be mass-produced and not elitist or dogmatic. By 1974, the Eameses were estimated to be receiving \$15,000 every month in royalties, yet spent at least that amount in research and development of new products. They first began using molded plywood technology at the service of the US Navy. In 1941-1942 they produced splints for wounded soldiers. This success allowed the Eameses to found the Plyformed Wood Co. They quickly sold the splint division of the company which allowed them to focus on using the technology in furniture. Their goal was to mass-produce high-quality, curved wood shaped at low-cost. After displaying their work at an exhibition at MoMA, Herman Miller acquired the rights to produce their furniture. Vitra then purchased the European production rights from Herman Miller in 1957. Today both companies still sell Eames products. (Fitoussi).



Fig. 11. Chair Prototypes

Kieran Timberlake

The work of Kieran Timberlake, a firm based in Philadelphia, puts great effort into material research in their office. The firm has an entire division dedicated to innovating/improving materials and processes. In their books and on their website they provide essays and technical data on their research and thought. For a project, they experimented with finishes of steel. The goal was to determine the best process to coat steel for an indoor application that was non-toxic. In detail, they explain how to best prepare the steel surface depending on which coating you are using. They explain the reason they chose a scotch-brite pad for the top-coat was because it was simple to create an even surface with it. They try different waxes, non-acidic patinas, Permaloc, Clearlok, Acrylaqc finishes. Another research project they undertook was a experiment with an exterior brick wall. The purpose was to achieve low-cost, low life-cycle costs and an accelerated building schedule for a student housing commission they were working on. This type of research is what every architectural firm should be doing but it does not seem to be the case. Kieran Timberlake understands these experiments might not be cost-efficient initially, but overtime they have developed the ability to make a better building. There could easily be a thesis in a series of processes like this because it is do-able for a student to work with true materials at the small scale. Yet the same issue occurs in work like this, innovation vs. process of perfection. At some point, innovation like this needs to give way to using the information enough to become efficient and profitable.



Fig. 12. Steel Applications

Tod Williams and Billie Tsien

In an essay written by Tod Williams and Billie Tsien titled *Slowness*, a unique design process is explained. While most firms are working toward a more efficient work strategy, they feel the only way to achieve well thought, complex spaces is by affording the luxury to slow design process down. Designer's in the office work with pencil and ink on vellum and mylar, rather than entirely on computer. They explain this is because when they make changes, they occur with effort and require a decent amount of tedious erasing to correct. It makes decisions go slower which in turn makes the process slower and ultimately, lengthens the project in its entirety. At their office, they have an entire system, where one project has a designated notebook that keeps all sketches and detail drawings together. Also in the office sits one pile of all the finished and un-finished drawings so the entire project can be reviewed from beginning to end. This pile's physical presence serves not only as satisfying evidence of work done, but also as a reminder of what more there is to do. The entire essay is an explanation of how things are done at the office and why. These architects know and understand they are inefficient in the way they do things but believe they can't accomplish the same quality of work any other way. Sennett's idea of making is thinking is obviously understood at this firm. "As our hands move, we have time to think and observe our actions". Both this reading and Sennett's helped produce the craft exercises that can help structure this thesis. Rather than just producing a building and a document at the end of the fall, these exercises can amount to a class or practices for anyone in the architectural profession. Williams and Tsien explains the problems with architectural process better than can. They have structured their practice around the idea of slowness in architecture, not only in process. Even architectural schools have forgotten about the importance of slowing things down and giving students enough time to think about what they are producing. Addressing unbuilt work, in general whether academic not, they explain the problem of ambiguity in work that has not yet gone through the phase of construction, where code, cost, use and other factors come into play. The design can be judged by others but design itself is only a part of architecture. Having the project produced without excessive compromise is a craft of its own. Thinking about this makes challenges where this thesis could end up. It could take a turn and begin to focus on having something built legally, efficiently, practically, etc. Even though concentrating on this would be impractical since whatever is designed will not be built, therefore there is no way to know if it was successful. Their argument is sound. Slowing down the process of design can bring a better design to completion. Maybe a study of inefficiency in process towards an efficiency in the final product could begin to form a project?



Fig. 13. Williams/Tsien Perspective

EXERCISES

Learning Process

In architectural education, as well as others, the learning curve may look something like this diagram. It can be viewed as a broad scope of the education process or in detail, broken down into all the different crafts of architectural design. For example, this diagram can illustrate a student's growth in a factor of design, such as drawing, or it can illustrate his/her growth in drawing with a specific lead holder on a specific mylar sheet with specific eraser, etc. Every scale in which this diagram is viewed shows what is happening to the student over time. Because of the large amount of material and small amount of time, the student may only experience growth sequence 1. However, the student reaching growth sequence 2 may be the only person with the ability to see his growth. At this level, he/she has already been through the steepest of the learning curve. Now leveling out, his improvements are so minute that it may seem useless or redundant to an observer. What the student is attaining at this level is a state of mind, where he/she knows if the work can be improved or if it is complete.

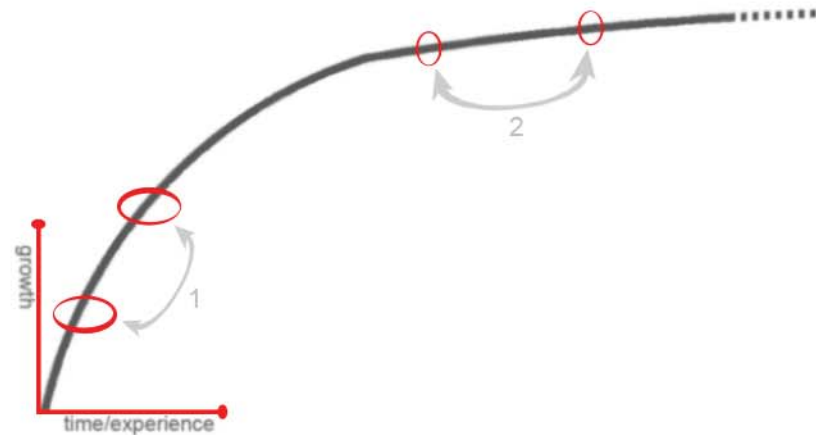


Fig. 14. Learning Curve Diagram

Craft

- An occupation, trade, or pursuit requiring manual dexterity or the application of artistic skill.
- An attitude towards what you are doing. It is putting care, in any discipline, into what you do.

Whether it is making a chair, a photograph, or a software program, it is basic human instinct to have the desire to do a job well for its own sake.

Exercise 1

"All craftsmanship is founded on skill developed to a high degree. At a higher degree, technique is no longer a mechanical activity; people can feel fully and think deeply what they are doing once they do it well." - Richard Sennett, *The Craftsman* (pg. 20)

In an effort to better understand craft, a simple exercise may bring clarity through the experience of the maker. In this case, a small wood joinery construct should be sufficient. Designed simply, then constructed and re-constructed over and over again will allow the builder to learn from the reconstructions while each improves in quality as the dexterity of the builder progresses. The purpose of this exercise is not to produce a perfected construct, it is to allow the builder to think about what he/she is making and react to it in the next re-construction. The construction of the joint should happen on one tool. This way, the builder will learn the smallest details of the machine, and the joint.



Fig. 15. Compound Miter Saw



Fig. 16. Joint Cut



Fig. 17. Cutting Half Lap



Fig. 18. Joints



Fig. 19. Joints



Fig. 20. Joints

Exercise 2

The second exercise allows thought to be out into the making of something architectural. Rather than design the product first then figure out how to make it, first the builder sees what is possible with the materials, tools, etc. In this case, a simple louver system is chosen to be produced.

Jig

- a plate, box, or open frame for holding work and for guiding a machine tool to the work, used especially for locating and spacing drilled holes.

Using efficiency as a major factor in the thought process, the exploration of jigs becomes part of the study. A jig device can be used to accurately and quickly cut the material. On the table saw, two parallel cut-outs of either side of the blade allows jigs to connect to the saw. The jig slides over the blade cutting the material placed inside. Installing the dado blade in the saw cuts the desired thickness out in one pass. Theoretically, a 4'x8' louver panel could be cut and assembled without measuring in under 30 minutes.



Fig.21.Louvers



Fig. 22. Louvers



Fig. 23. Louvers

Dado Jig

As part of Exercise 2, this jig was designed to ride across the table saw with a dado blade. Exercise 2 is a study of becoming familiar with the tool. Once the designer understands the limitations and possibilities of the tool, then can he/she make whatever product is desired. The user can then make the product efficiently by working within the limitations of the tool.



Fig. 24. Dado Jig



Fig. 25. Cutting With Dado



Fig. 26. Using Dado Jig

Exercise 3

“It is so easy to use the cushion of past thoughts to soften the terrifying free fall of starting a new project. It is natural tendency to use the solution we know will work. As young and naïve optimism is replaced by knowledge that is often hard won, we struggle to keep pushing ourselves to do something we haven’t done.” -Tod Williams and Billie Tsien

This exercise begins to explore the issue of innovation vs. pursuit of perfection in craftsmanship. While innovation is obviously an important part of architecture, the process of perfecting the product is sometimes overlooked because it is mundane and monotonous to rethink such small details. The boathouse gives me a program of what needs to happen with walls, ceiling, floor, etc. Once a program of each product is established, then can thought be put into how it will be made, and what it will look like.

PROGRAM AND SITE

Program

Community Boathouse

- Racks to accommodate (15-20) rentable sculling and sailboats, etc.
- Sail, Paddle, Misc. Storage
- Launching Dock and Slips

This program is consciously intended to be small, where a great amount of focus can be put into the details of the project. This thesis is intended to focus on craft in design process/product therefore the project itself will be the result of it. A boathouse had been chosen because of its scale, tradition, history and specific elements necessary for its intended use. Also, realizing the idea of craft is widely thought to be inaccessible to the non-elite classes the result of this research could possibly be intended to benefit a community.

Location - Winter Park. FL

The site chosen for this project is Kraft Azalea Garden on Lake Maitland at 1365 Alabama Drive, Winter Park, FL. Realizing a site that will be accessible throughout the thesis semesters would be beneficial for several reasons, I began searching in Florida for a potential location. Central Florida has a long history of boat culture not only from the sheer number of lakes dotting the landscape but from Cypress Gardens opening in Winter Haven in 1936 and the crew teams of Rollins College founded on the shores of Lake Virginia in 1885. The chain of lakes in Winter Park includes Lake Virginia, Lake Osceola, Lake Maitland, Lake Mizell, and Lake Minneola. Together covering more than 2,781 acres, navigable canals constructed to control flooding and run logs to a sawmill on present day Lake Virginia link the lakes together. Kraft Azalea Gardens is a pristine 5.33 acre public park on the largest lake in the chain. The Rollins College U.T. Bradley Boathouse sits immediately adjacent to the park on its west side.

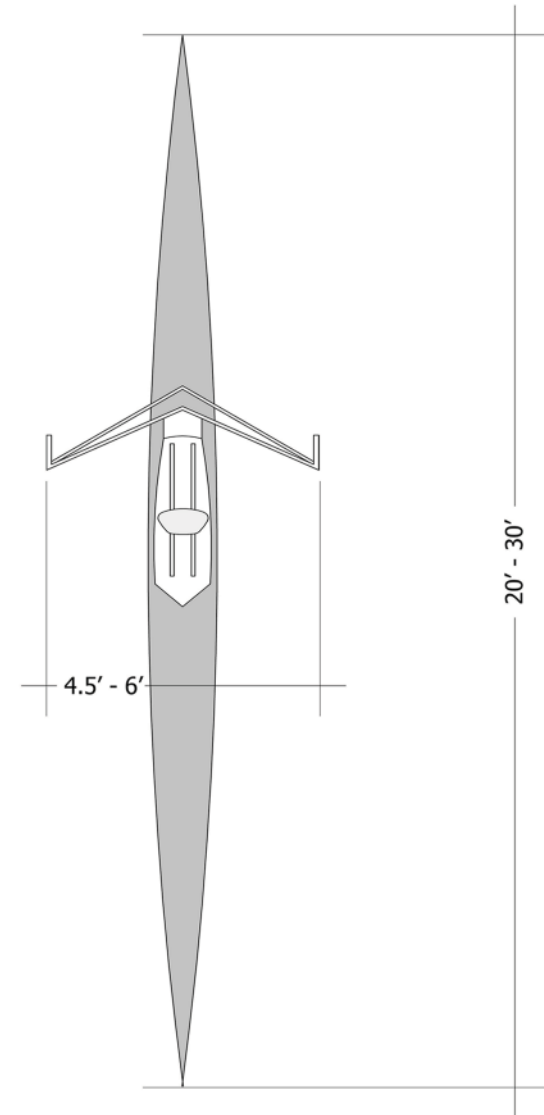


Fig. 27. Scull Dimensions

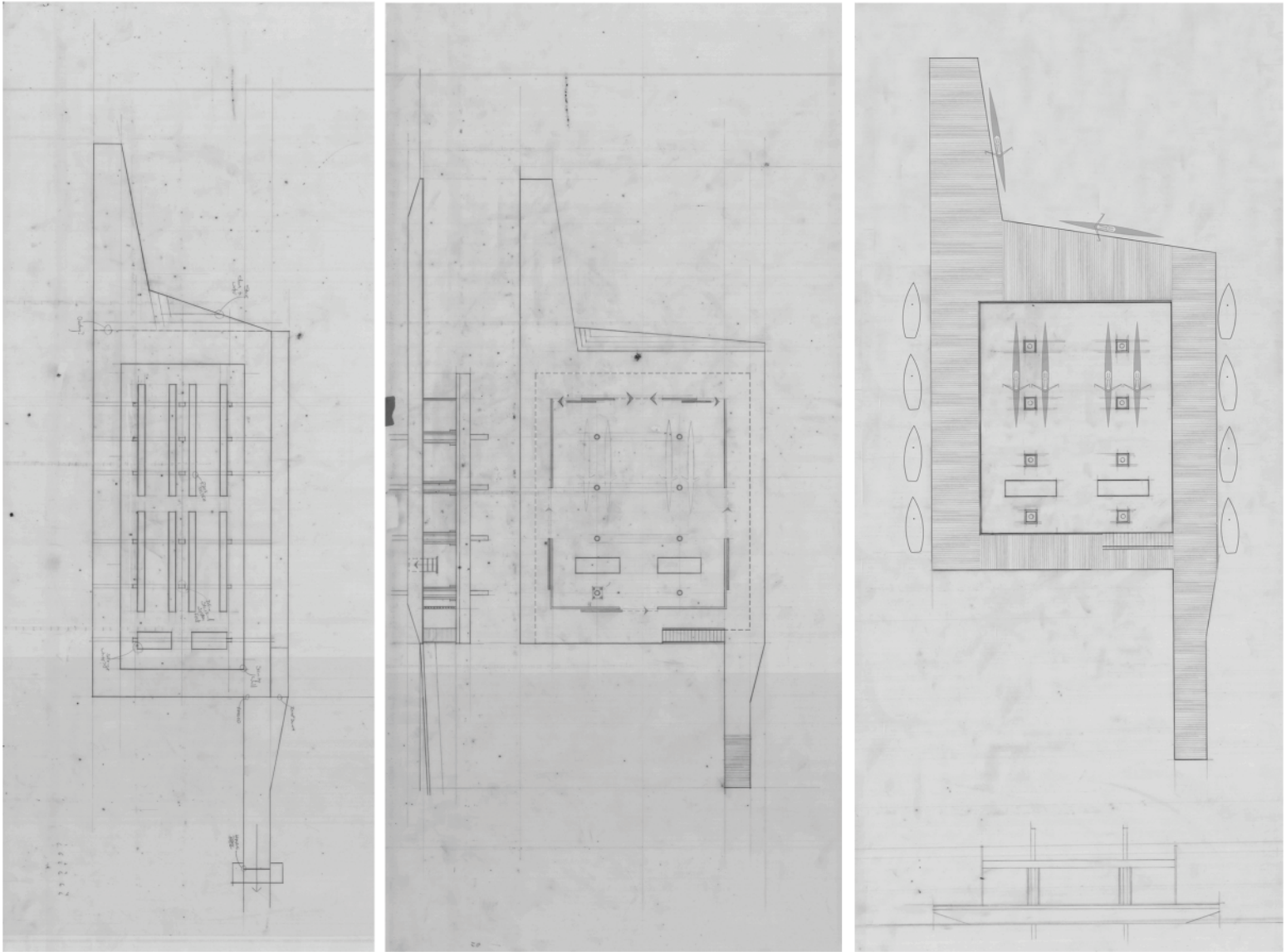


Fig.28. Floor Plan Process



Fig.29. Chipboard Drawing 1



Fig. 30. Chipboard Drawing 2



Fig. 31. Chipboard Drawing 3

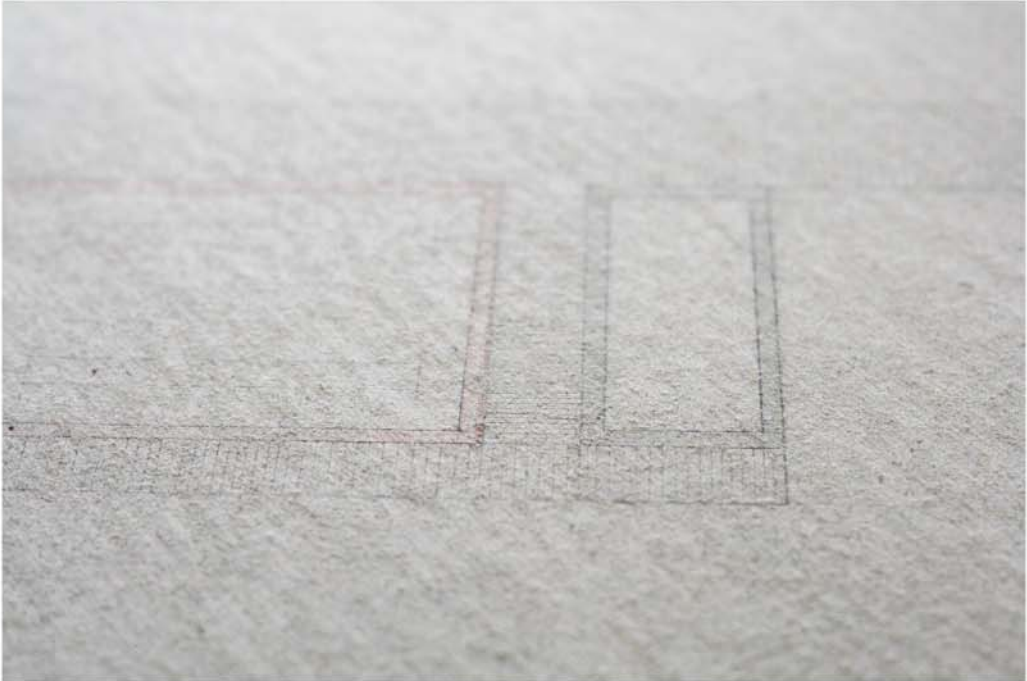


Fig. 32. Chipboard Drawing 4

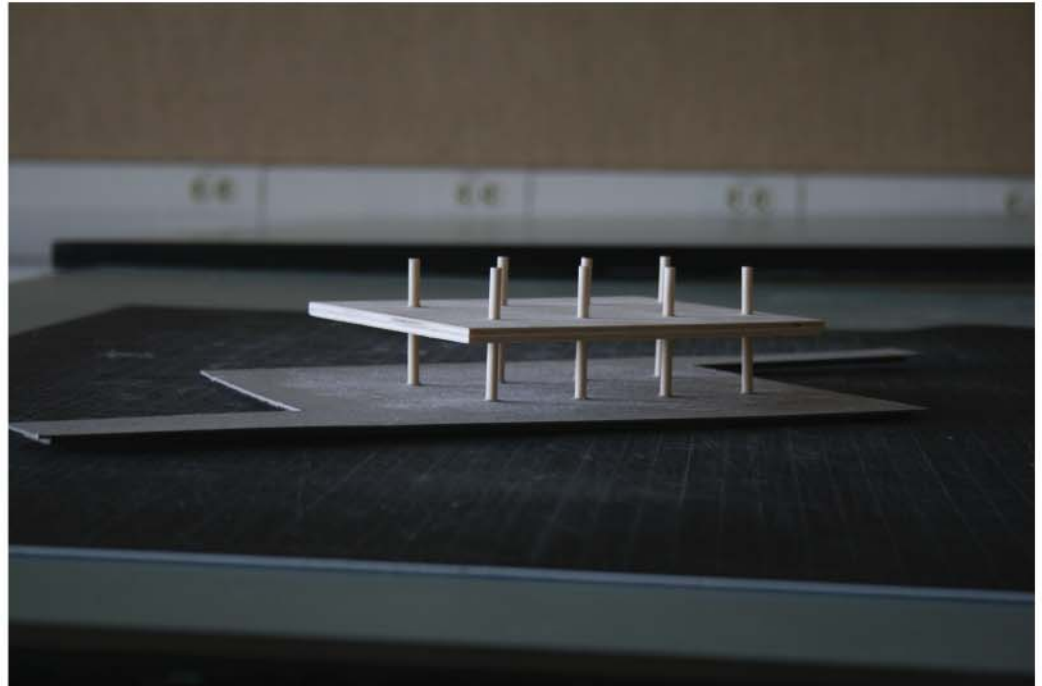


Fig.33. Preliminary Model 1

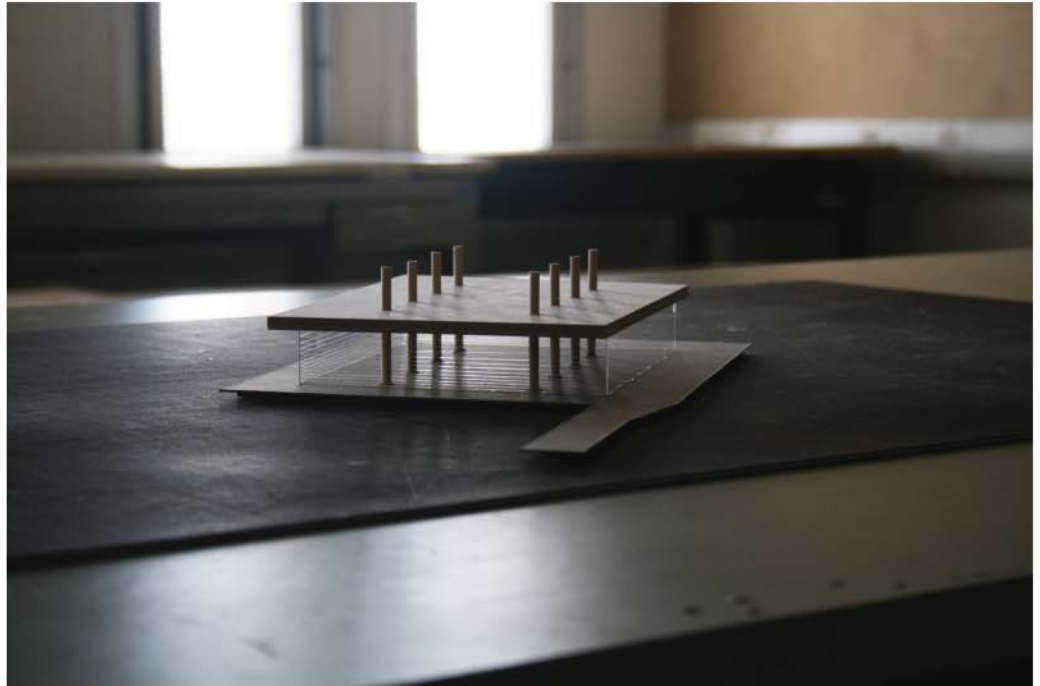


Fig. 34. Preliminary 2

Site



Fig. 35. Rollins Boat House



Fig. 36. View from Kraft Azeala Park



Fig. 37. Alabama Drive



Fig. 38. Sculling on Lake Maitland

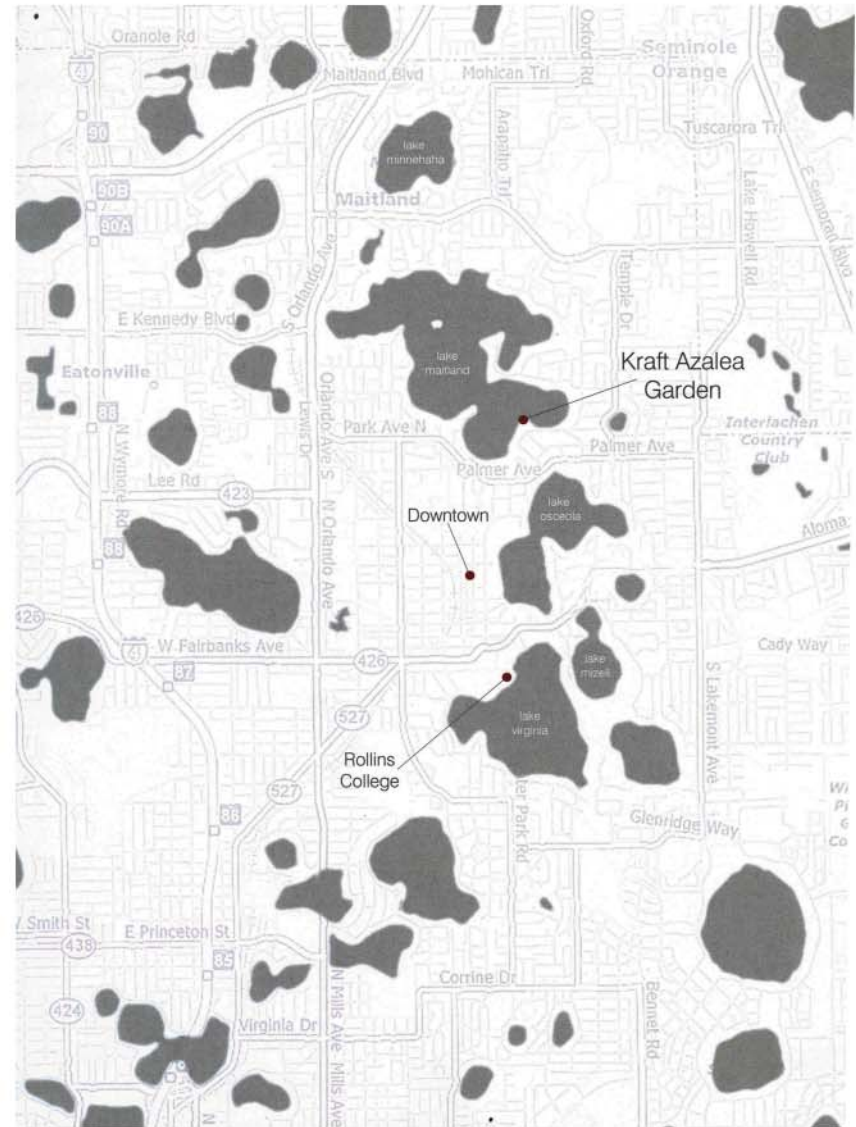


Fig. 39. Winter Park Area



Fig. 40. Aerial View of Kraft Azalea Park

Innovation vs. Pursuit of Perfection

Innovation is such an important part of architecture that, for the most part, it is the nature of the architectural education and practice to end their process at the idea and move on to the next without finishing the task. If it does not evolve or conform to materials and methods in making the object, it is useless. It may be even fair to assume, any project that does not innovate may be deemed unsuccessful by other architects or judging theorists and critics. These thoughts do hold validity in architecture but the idea of innovation is not being considered in its entirety. Innovation needs to be extended to the realm of making the idea happen. Rather than simply explaining how the object will be produced, it is essential that all aspects should be considered. Once the process is thought out, then can designers extend the process to evolve into something else. This extension will most likely occur in another project down the road. While it is important to not dwell on any certain group of thoughts, it should be encouraged to reuse past ideas in a new perspective. Craft in this realm of architecture occurs throughout the phases of innovation but also occurs over time. If the piece is constructed 5 times by the same person in a controlled setting, the fifth piece will obviously be produced better and more efficiently than the first. The maker understands the obvious from the beginning but will only learn about the ambiguous over time. Because the correct process of innovation uses valuable time and means at an architect's office, using the thought once would be unjust. As long as the thought continues to evolve it should be considered.

Wall Assembly Process

Wall Assembly 1



Fig. 41. Wall Assembly 1



Fig. 42. Wall Assembly 1



Fig. 43. Wall Assembly 1



Fig. 44. Wall Assembly 1

Blades

After making the preliminary wall assembly 1, it was obvious the curved columns would need a bit more attention. In order for the louvers to sit flat on each column, the curve needed to be cut with an angle, which differs on every column along with the overall radius of each curve. After Exercise 2, the thought of the jig was sitting fresh in memory. Rather than making a jig to produce something efficiently, the task was now to simply have the ability to make something that is complex. The compound curve forced a good amount of time, process and innovation since the wall needed to be built in multiple scales.



Fig. 45. Blade



Fig. 46. Blade Shape



Fig.47. MDF strips with mounted autocad prints



Fig. 48. Blades ready for assembly

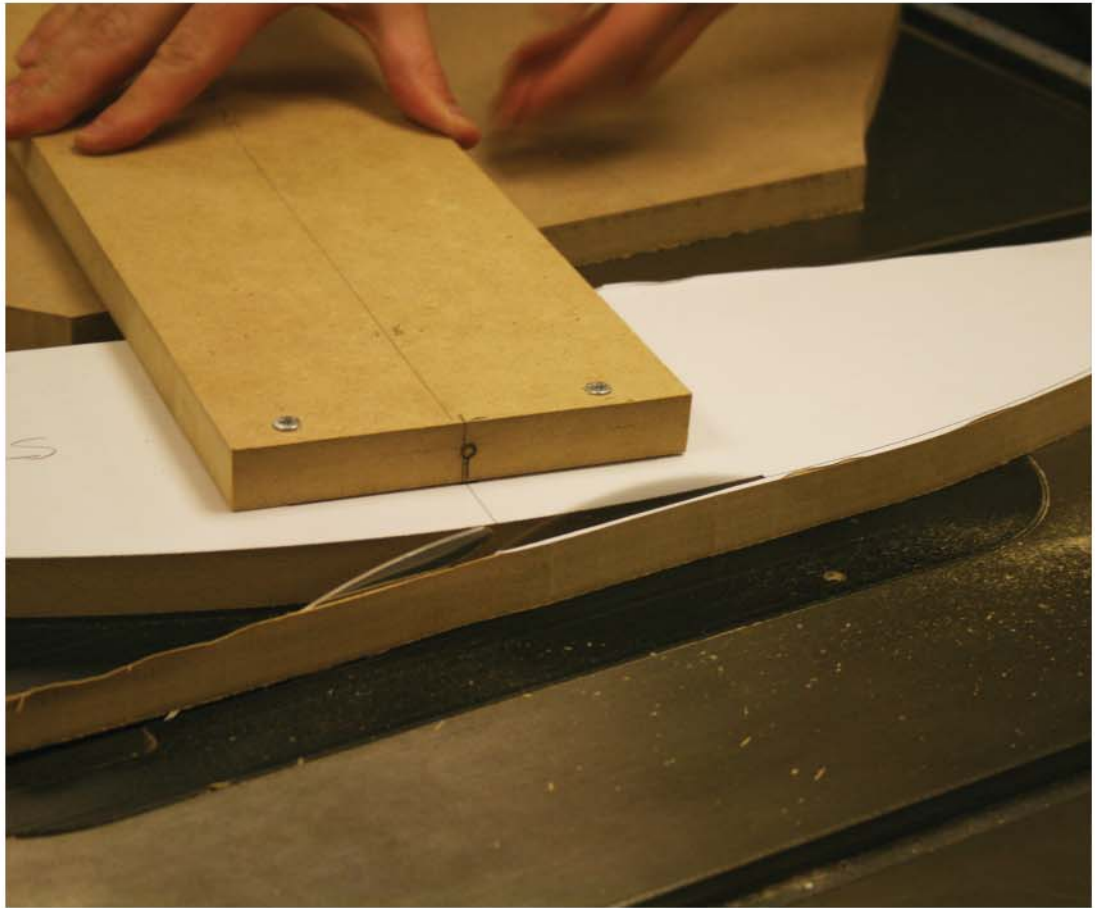


Fig. 49. Blade Cut with Jig



Fig. 50. Texture left from blade

Architect as Tool Maker

Once the maker becomes familiar with whatever tools are needed or available, as a designer, he/she can work with the tools abilities and limitations. A table saw, for example, has a maximum blade height, minimum angle, maximum sheet size, etc. The same goes for a compound miter saw, band saw, etc. or the more technical laser cutter and cnc machine.



Fig. 51. Jig designed to cut multiple radius curves

Universal Jig 1

Realizing the possibility of cutting a curve from the radius, this was the first attempt at a jig. Although roughly made, it is extremely accurate after multiple calibrations.



Fig. 52. Table Saw Jig

Wall Assembly 2



Fig. 53. Wall Assembly 2



Fig. 54. Wall Assembly 2



Fig. 55. Wall Assembly 2



Fig. 56. Construction of Wall Assembly



Fig. 57. Louvers sitting on compound curved columns

Universal Jig 2

What was learned from jig 1 was put into the design of jig 2. Although, the design was not entirely free of flaws. Even though the jig required less calibration than the first, many improvements would be made in the third.



Fig. 58. Table Saw Jig



Fig. 59. Cutting compound curve with jig

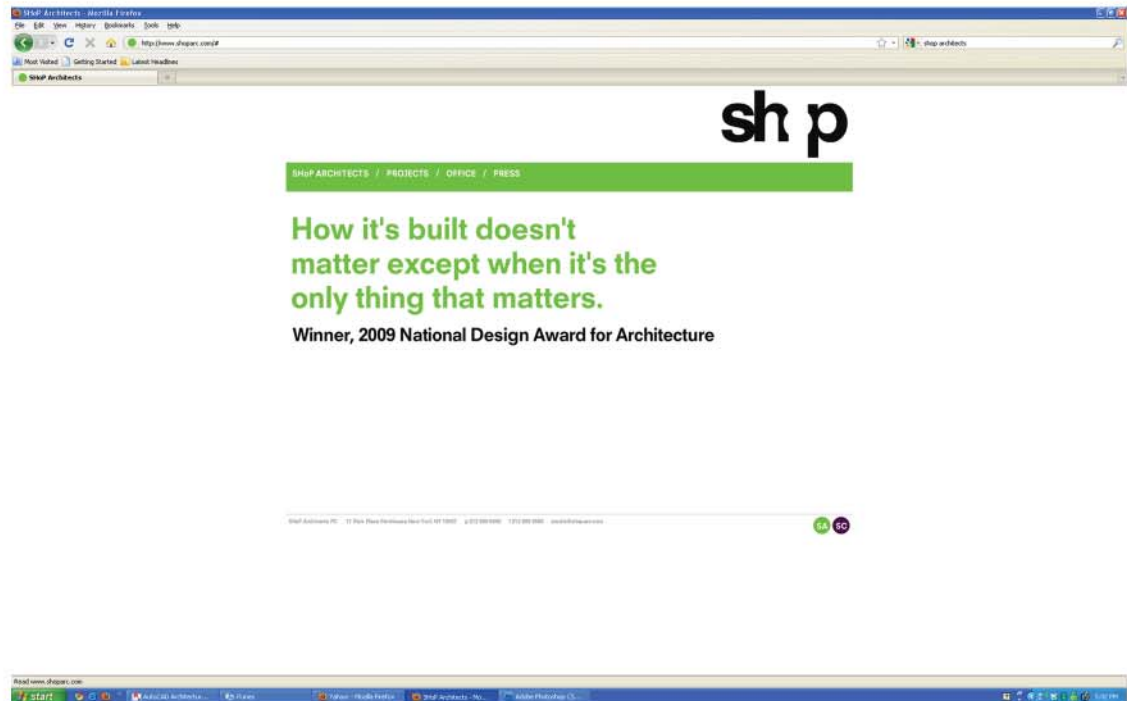


Fig. 60. SHOP website quote

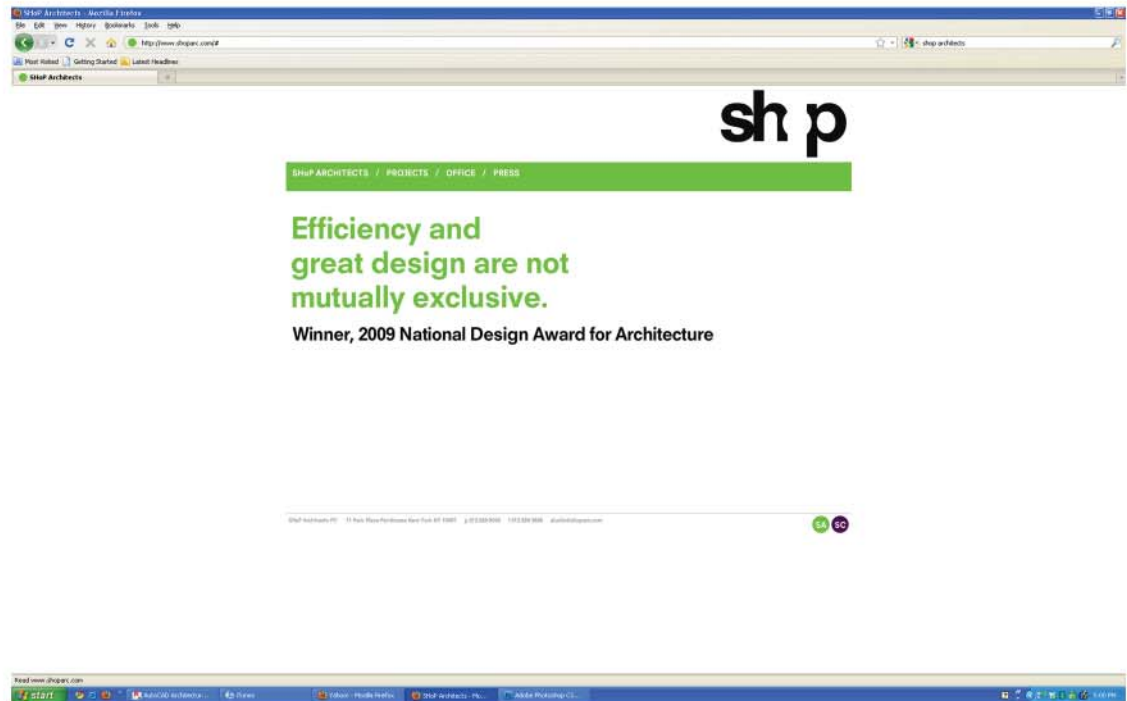


Fig.61. SHOP website quote

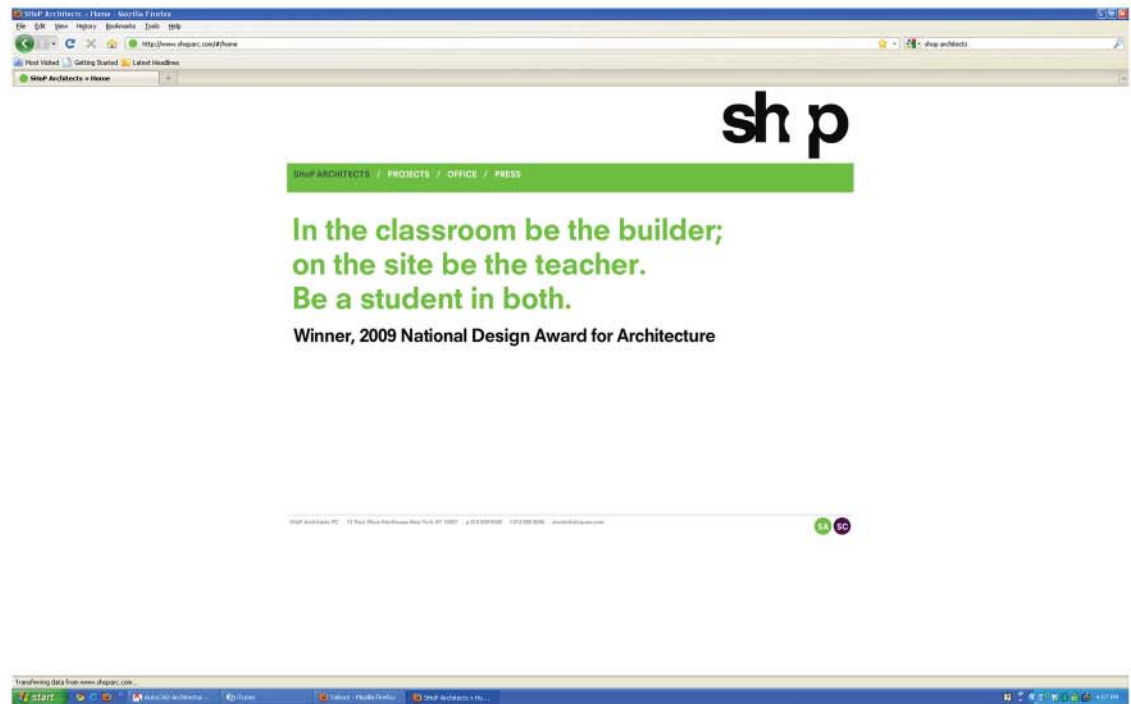


Fig. 62. SHOP website route

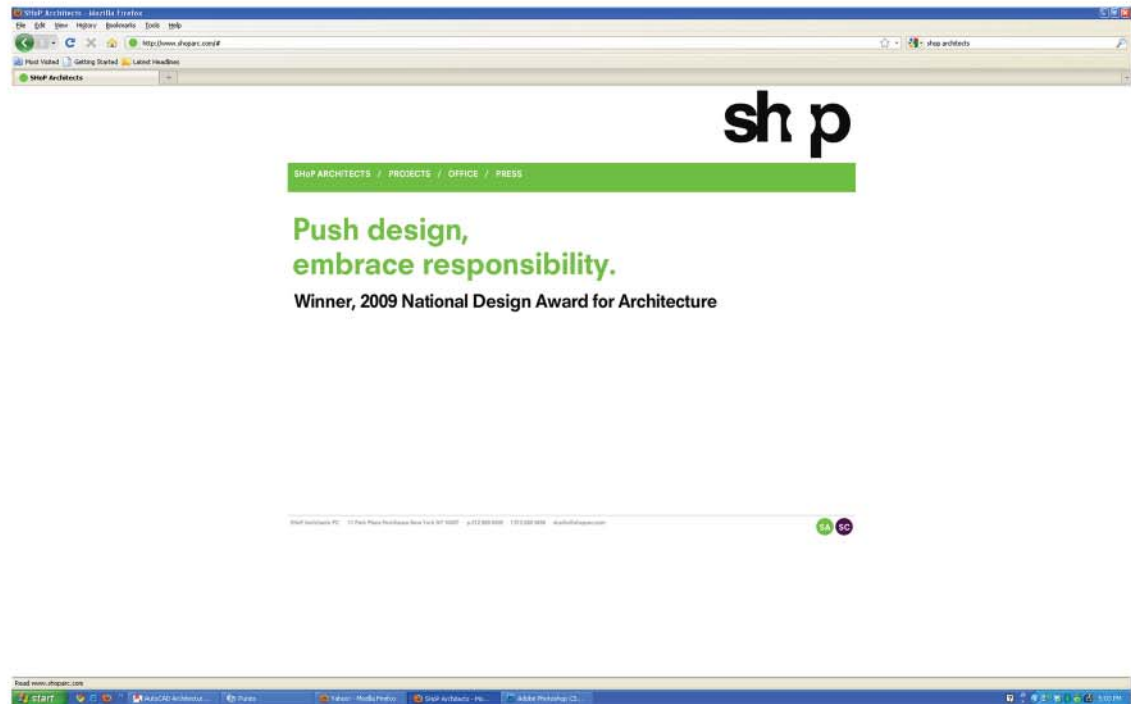


Fig. 63. SHOP website route

Technology

Respect must be given to technology for its ability to efficiently and accurately design. In CAD, the simplest of design programs, a designer can easily draw and dimension nearly every aspect of whatever he/she is making. Especially useful at a large or full scale, without CAD the simple beginning steps of drawing out the piece would be a huge task. Before technology, boat builders used a technique called Lofting. In order to accurately build the boat, the maker first had to draft the plans and sections of the boat at full scale on the floor surface of boat building shop. Obviously this was a huge task that required great skill and time to accomplish.

Laser and CNC cutting is another fixture in design practice that must be respected. Its ability to cut ultra-precisely in multiple dimensions makes these tools remarkably useful. Be no means is this the end of craftsmanship. The maker is simply changing his media. The same amount of care should be put into the use of these tools as a woodworker with a chisel.

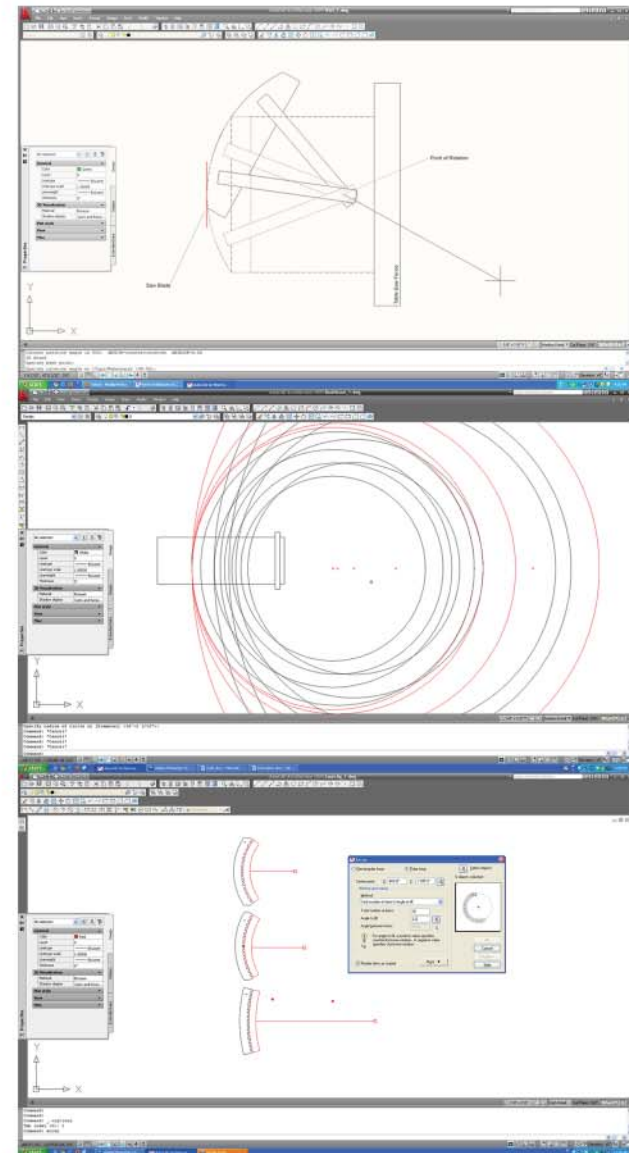


Fig. 64. Cad Drawings

Wall Assembly 3



Fig. 65. Wall Assembly 3



Fig. 66. Wall Assembly 3



Fig.67. Wall Assembly 3



Fig. 68. Wall Assembly 3



Fig. 69. Wall Assembly 3

Universal Jig 3

Thought to possibly be something of a marketable product, this jig was made from furniture-grade 3/4" maple plywood. Under the pivoting trammel arm, a straight 1" wide strip was routed 1/2" deep. In this strip sits an easily replaceable wood plug-in. This plug-in is intended to be replaced when too many screw holes begin to alter the precision. The jig can cut any radius within the constraints of the saw's table surface and can be re-used indefinitely.



Fig. 70. Table Saw Jig

Screw Options

Several screw types were assessed varying in head types, width, threads, etc. Eventually, a stainless steel self-drill-tipped square-headed screw was chosen for its efficiency, resilient, and aesthetic qualities.



Fig. 71. Screw Test

Screw Alignment 1

After constructing wall assembly 1 and 2, a reoccurring flaw exposed itself once again and most extremely in wall 3. Alignment of the screws perfectly every time became too much to bear. The monotonous act required simply too much concentration even after hundreds of times. Fixing this defect became a way to put this thesis of craft into practice. Though it seemed it was a relatively small problem, putting thought into a solution would warrant not only a better final product, but a more efficient process of assembly where the installer needs not be a skilled craftsman, but a somewhat unskilled worker.



Fig. 72. Alignment Mock Up 1

Screw Alignment 2

Constructed to assure the idea of cutting a blade-thick shallow cut into the face of the columns would create a perfect line of screws, the assembly became an idea to be used in the future. Whether it is another louver system or a furniture piece, wall, etc., the idea, a forced by-product in this design, could be utilized and perfected in another project at another time.

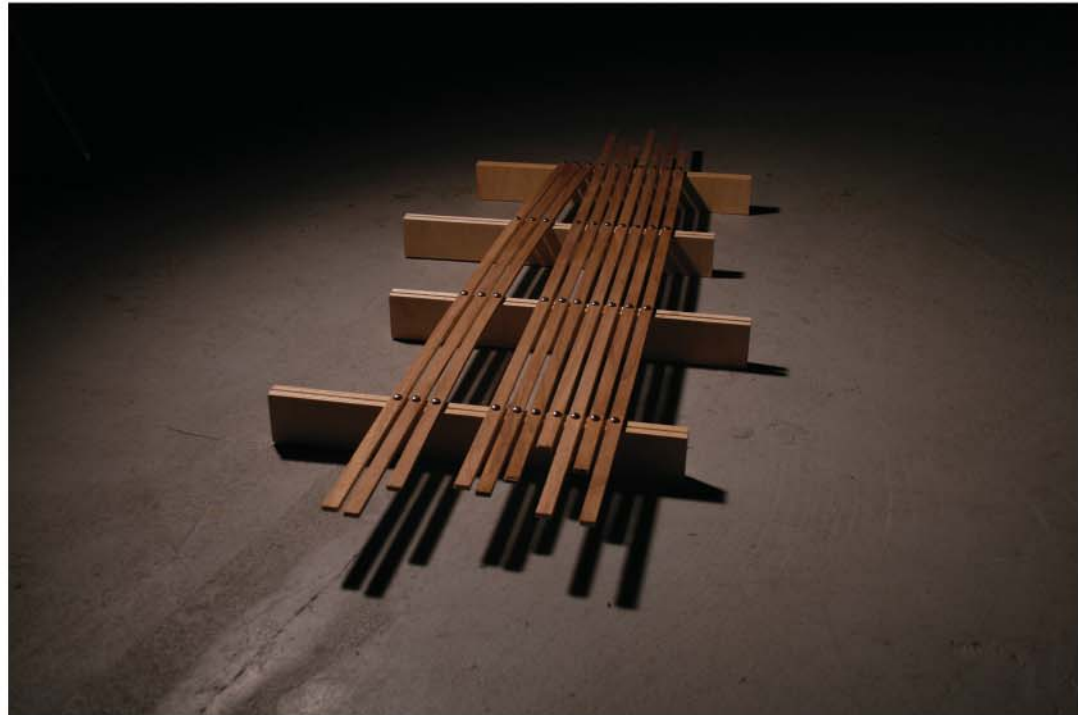


Fig. 73. Alignment Mock Up 2

Assembly Jigs

These jigs are the result of understanding the complications of assembly after making walls 1,2 and 3. They force and hold the louvers into perfect placement and while so they can be efficiency fastened.



Fig. 74. Assembly Jig

Assembly Jigs (disassembled)

Once all louvers are fastened the alignment jigs can be disassembled and removed.



Fig. 75. Assembly Jig

Assembly Jigs (broken)

Once the construction of wall 4 was complete (with the use of the alignment jig), an obscure problem became evident. The jigs could not be pulled off the wall once it had been unclamped. Because the semi-circular shape, the louvers pinched the teeth of the jigs. The only solution was to tear and saw the jigs off the wall without damaging the wall itself. The alignment jig did however simplify the assembly and greatly speed up the process.

Since the jig proved itself in wall 4, the evolved version of it would be made to construct the 1/2 scale section of the wall. Rather than having fixed spacer teeth, the new jigs would be made with screw on spacers which could then be easily unscrewed and removed after the louvers are secured in place.



Fig. 76. First assembly jigs after removal

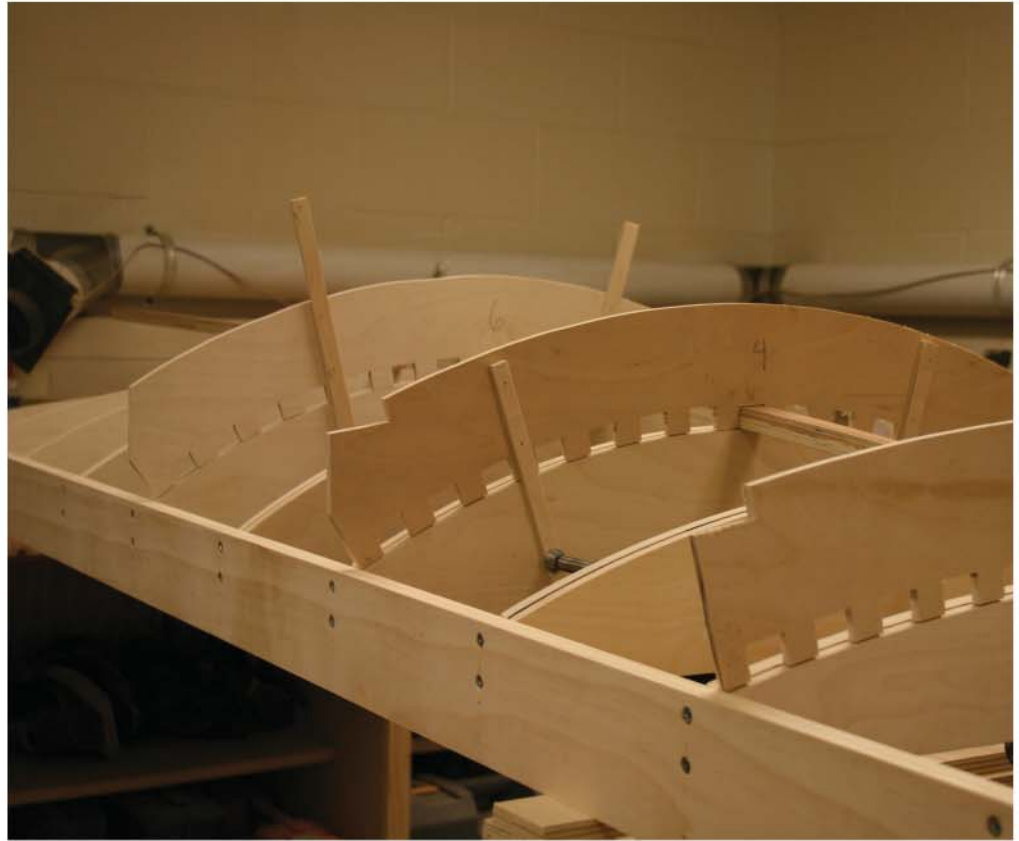


Fig. 77. Wall Assembly with jigs attached



Fig. 78. Wall Assembly near completion



Fig. 79. Wall Assembly



Fig.80. Wall Section Model with assembly jig attached



Fig. 81. Wall Section Model with assembly jig attached

PLANS, SECTIONS, AND PERSPECTIVES

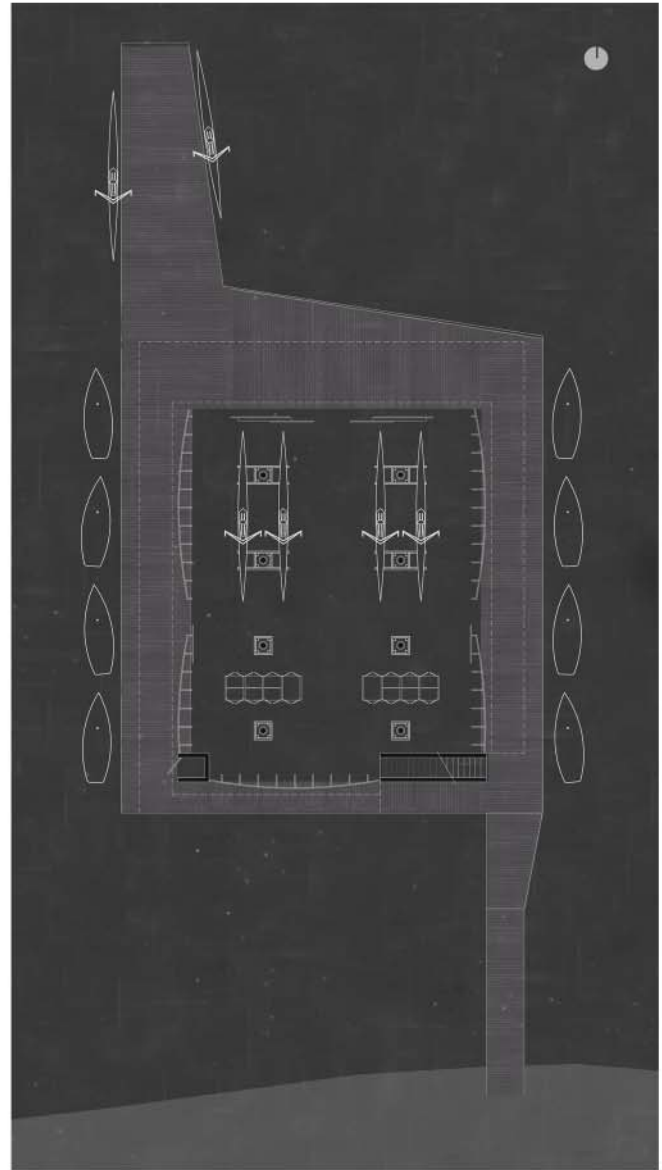


Fig. 82. Plan

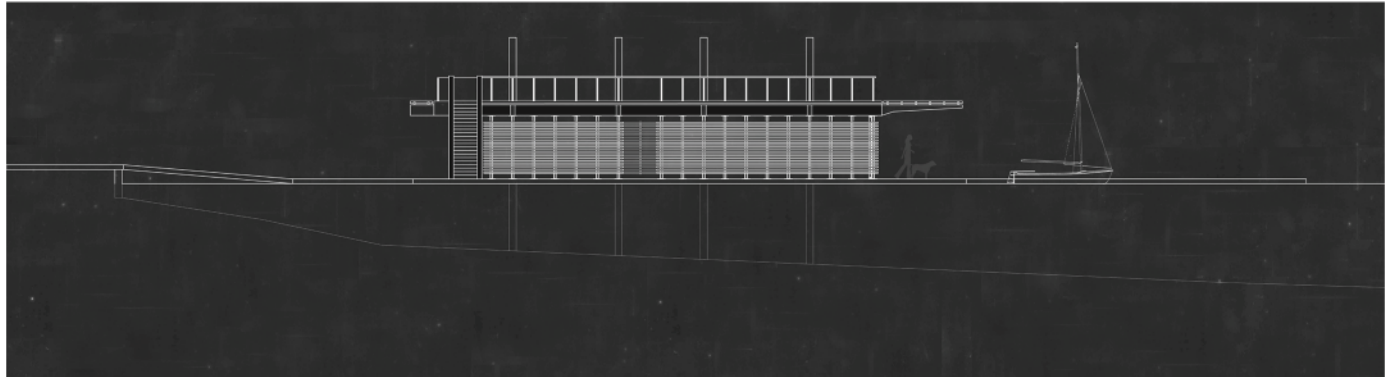


Fig. 83. Elevation



Fig. 84. Interior Perspective



Fig. 85. Exterior Perspective



Fig. 86. Exterior Perspective

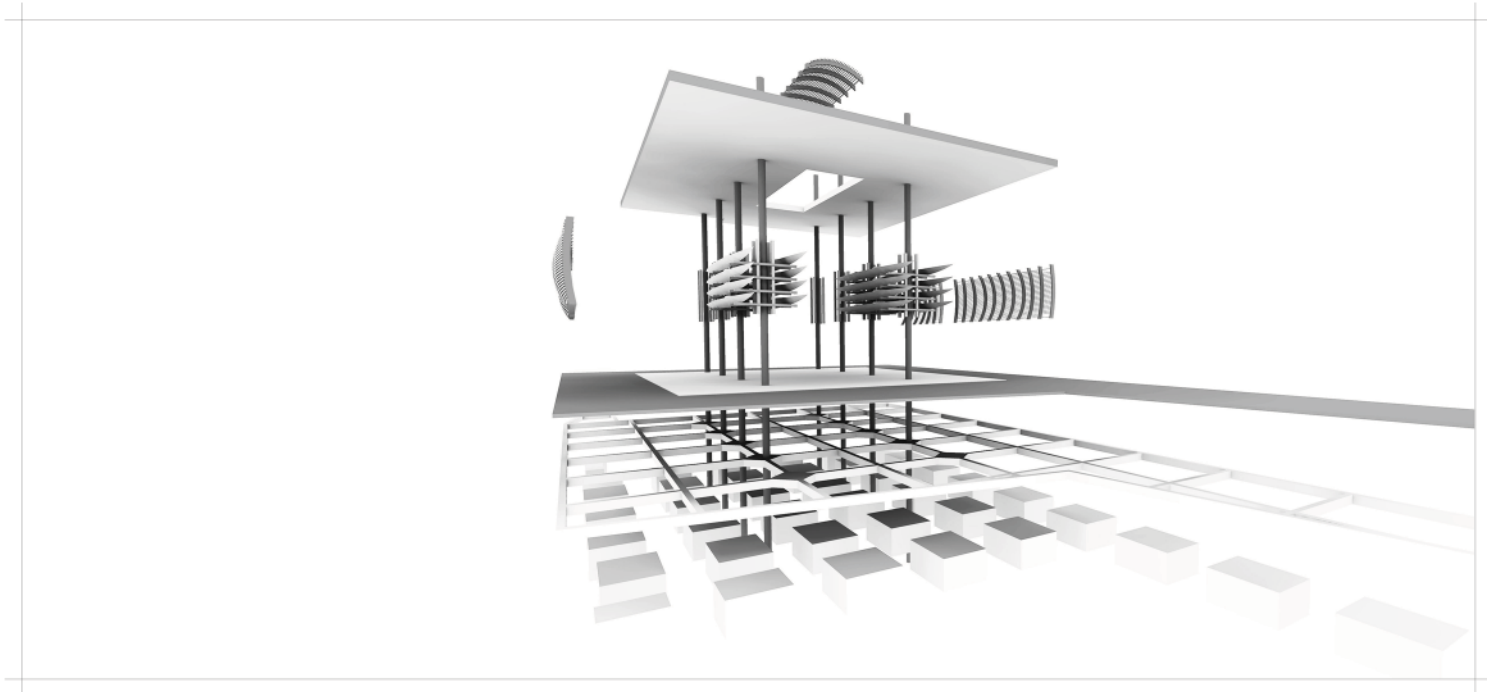


Fig. 87. Exploded Perspective

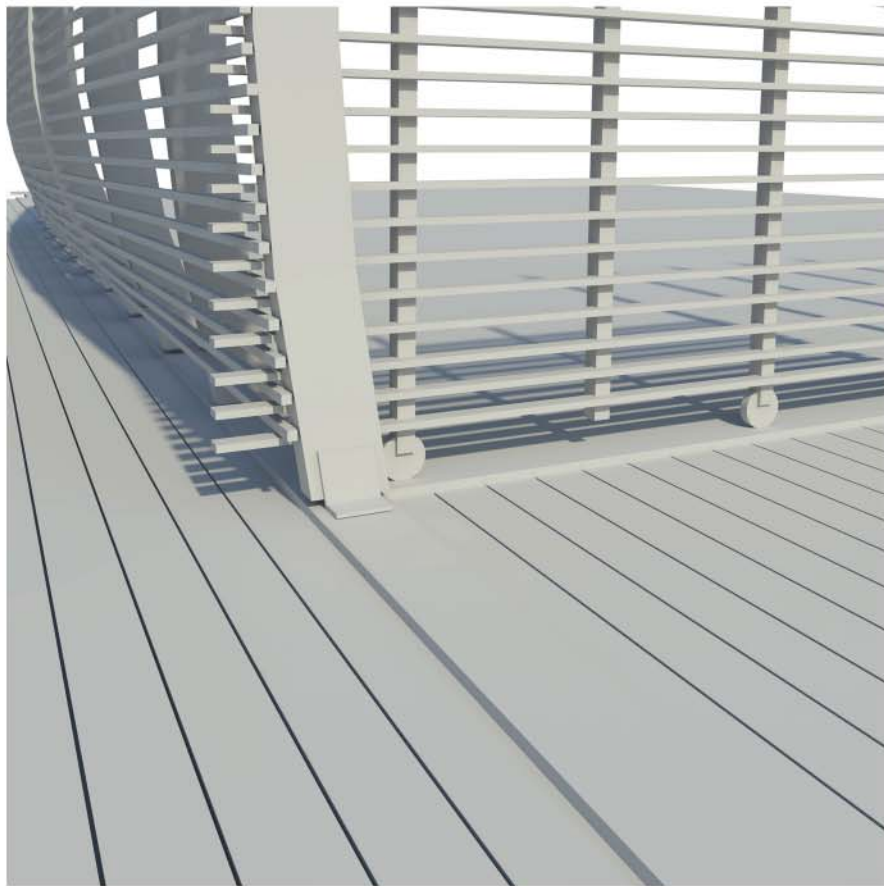


Fig. 88. Corner

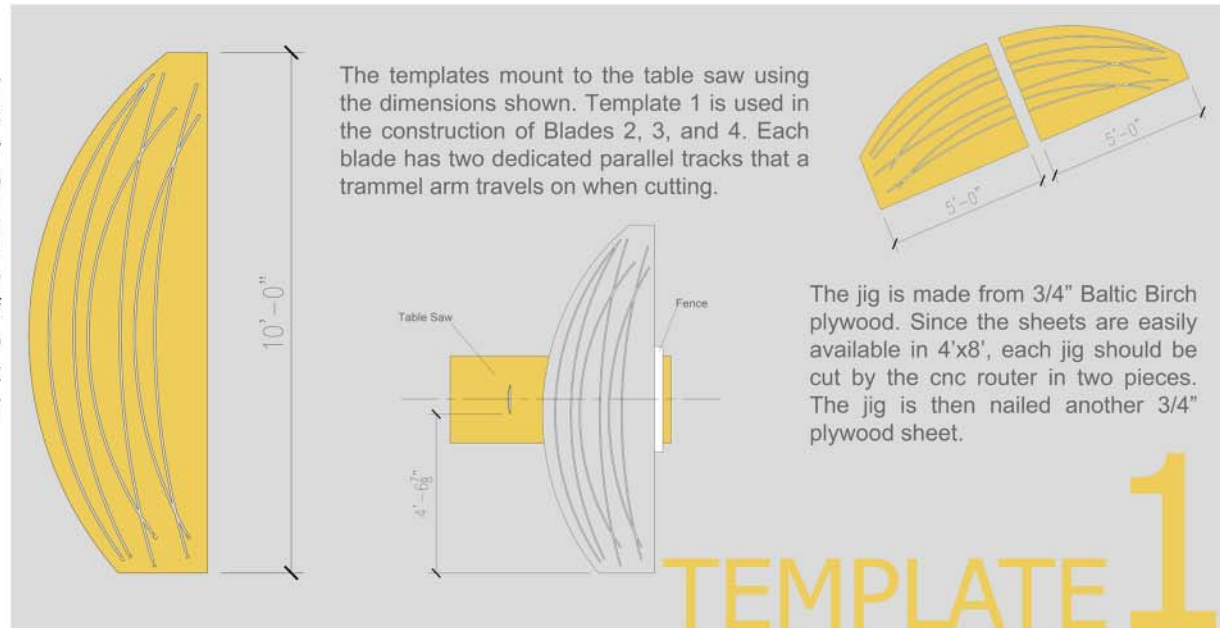


Fig. 89. Detail Section

SHOP DRAWINGS

Template 1

An effort was made to not only think about about the way this boathouse is built, but also, how the designer can portray ideas to the actual builder. Realistically, hardly any building is designed and constructed by the same person. Therefore, a series of shop drawings can be made to not only describe the pieces but also the tools and jigs necessary to construct the design.



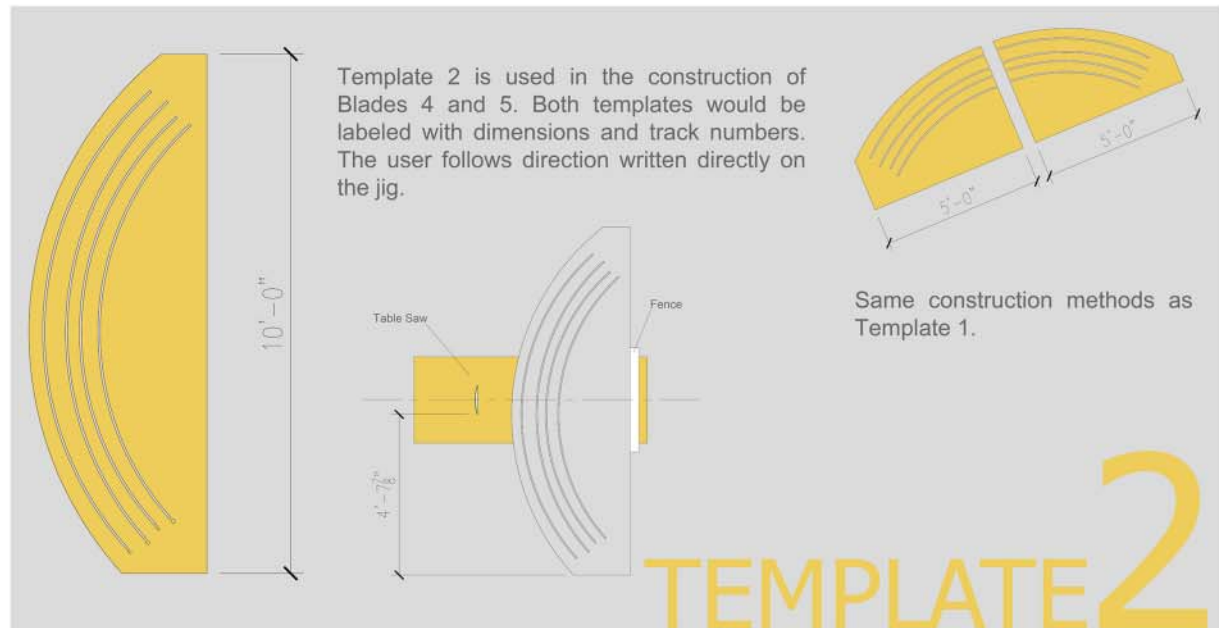
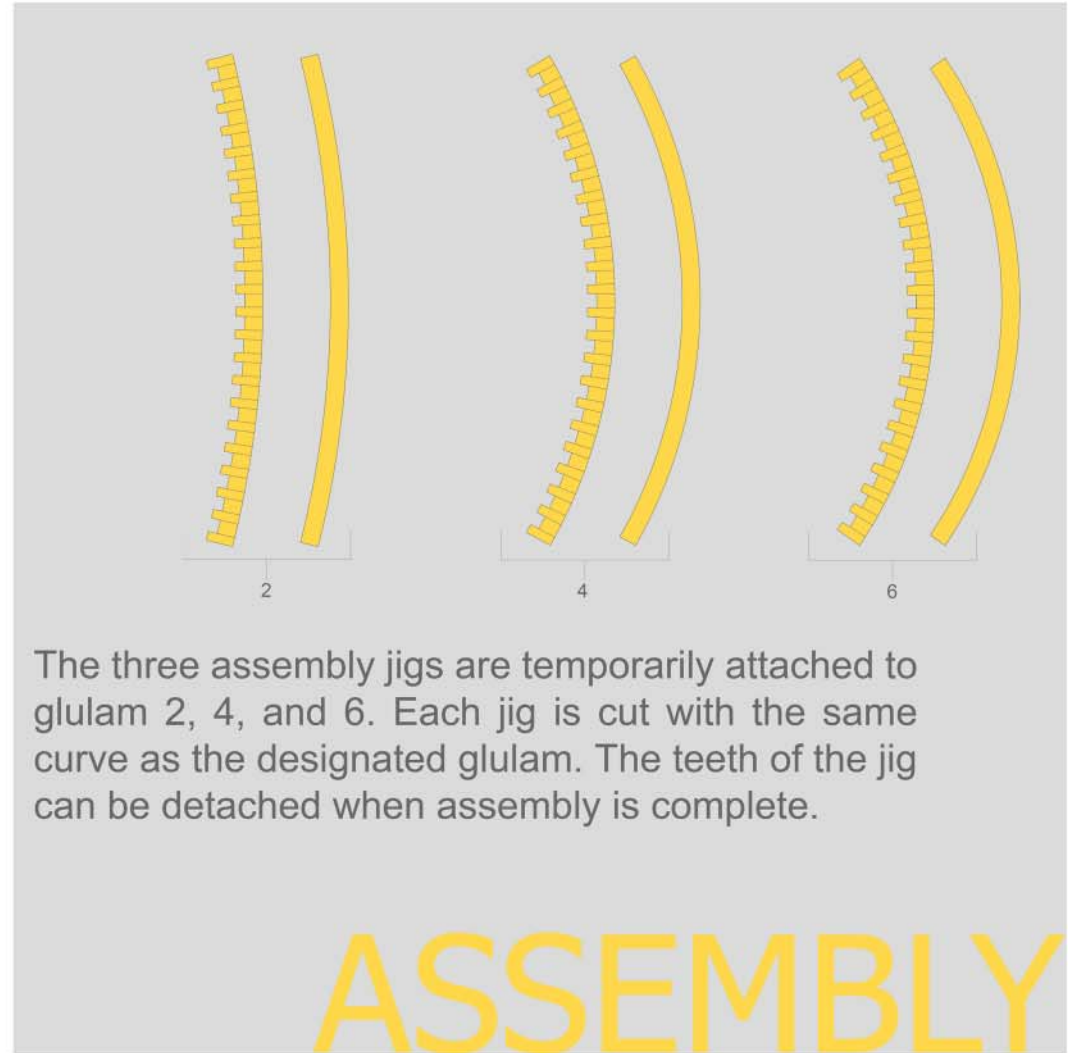


Fig.91. Template 2



The three assembly jigs are temporarily attached to glulam 2, 4, and 6. Each jig is cut with the same curve as the designated glulam. The teeth of the jig can be detached when assembly is complete.

Fig. 92. Assembly Jigs

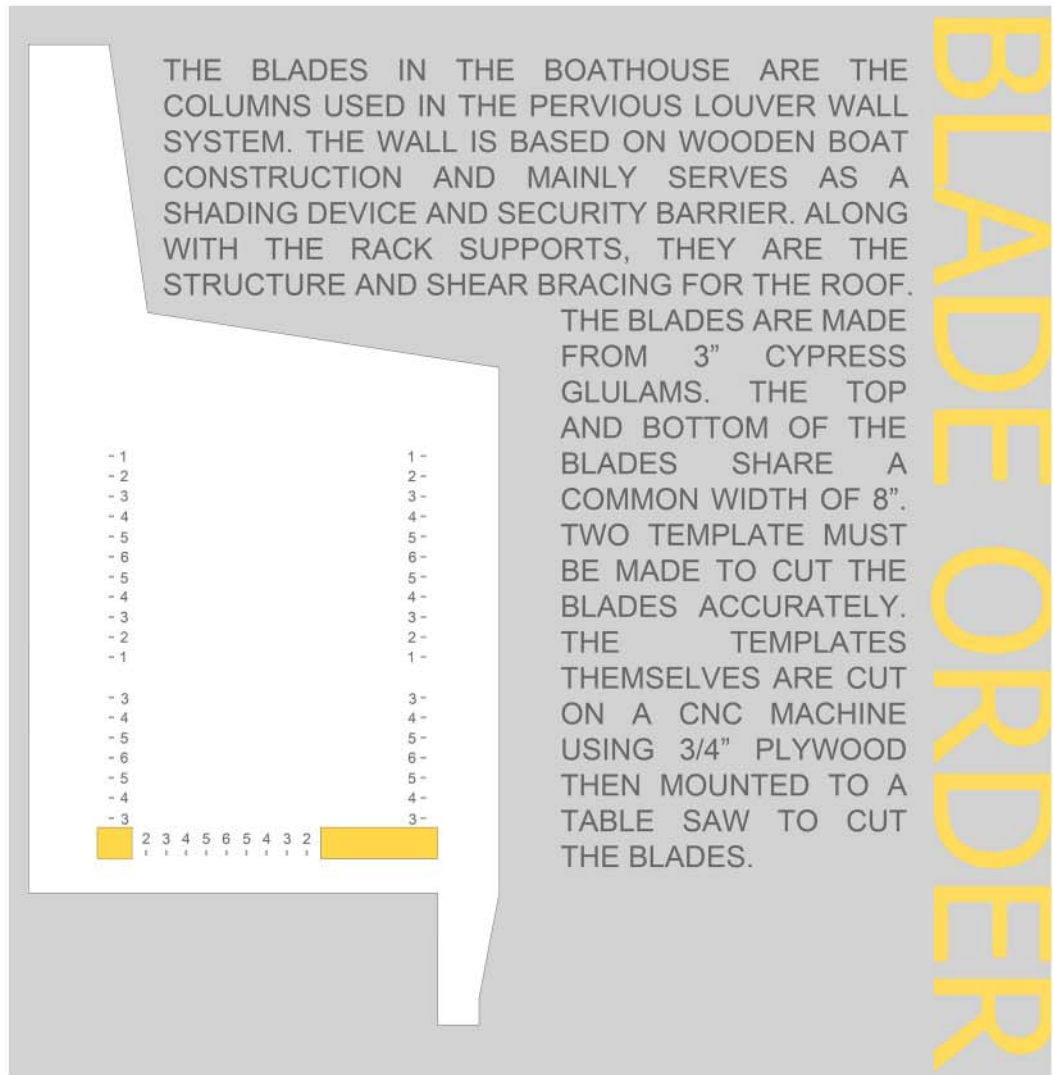


Fig. 93. Blade Order

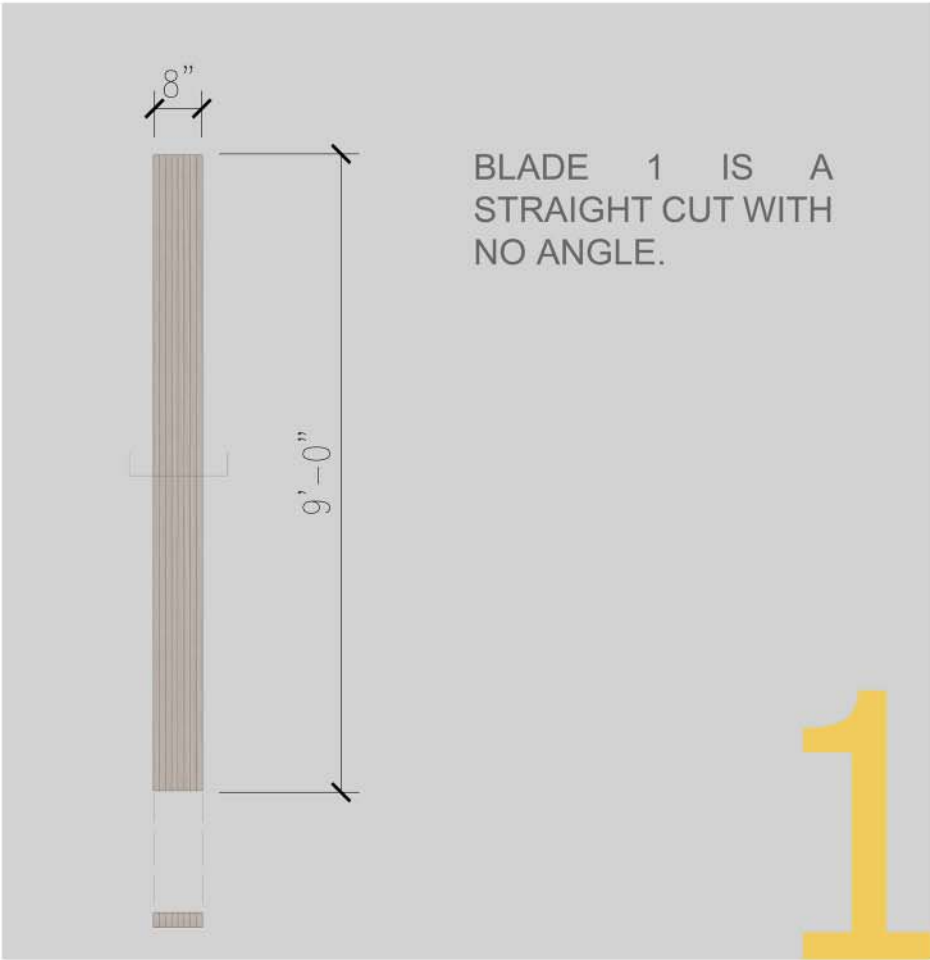


Fig.94. Column 1

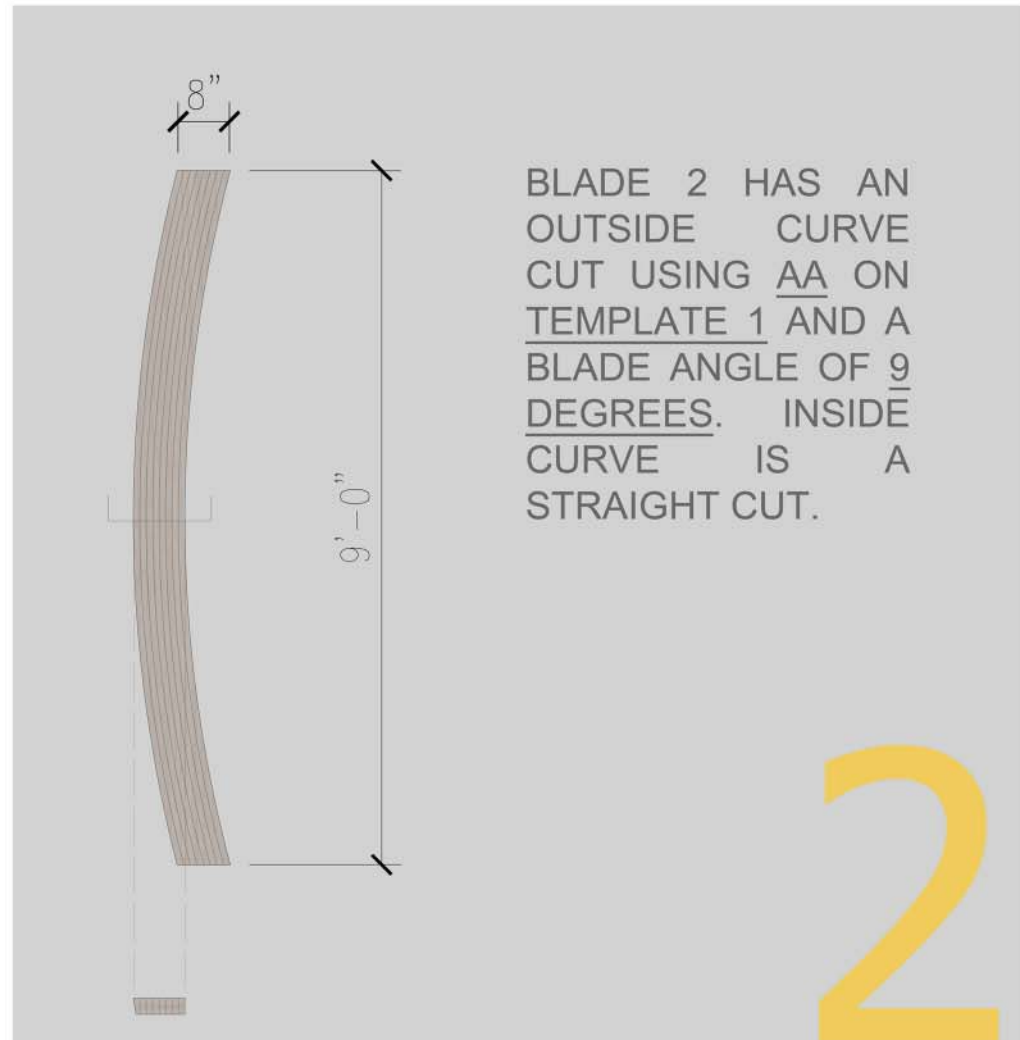


Fig. 95. Column 2

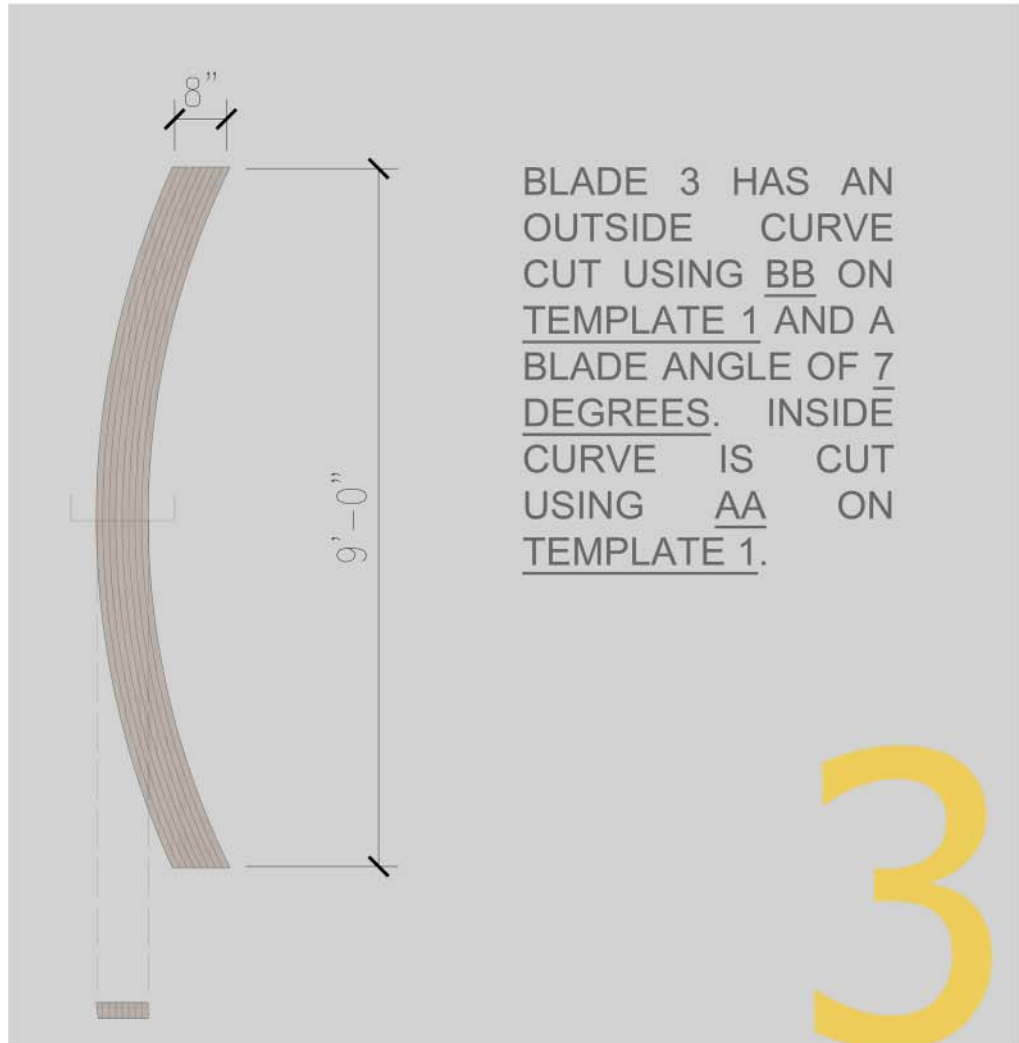


Fig.96. Column 3

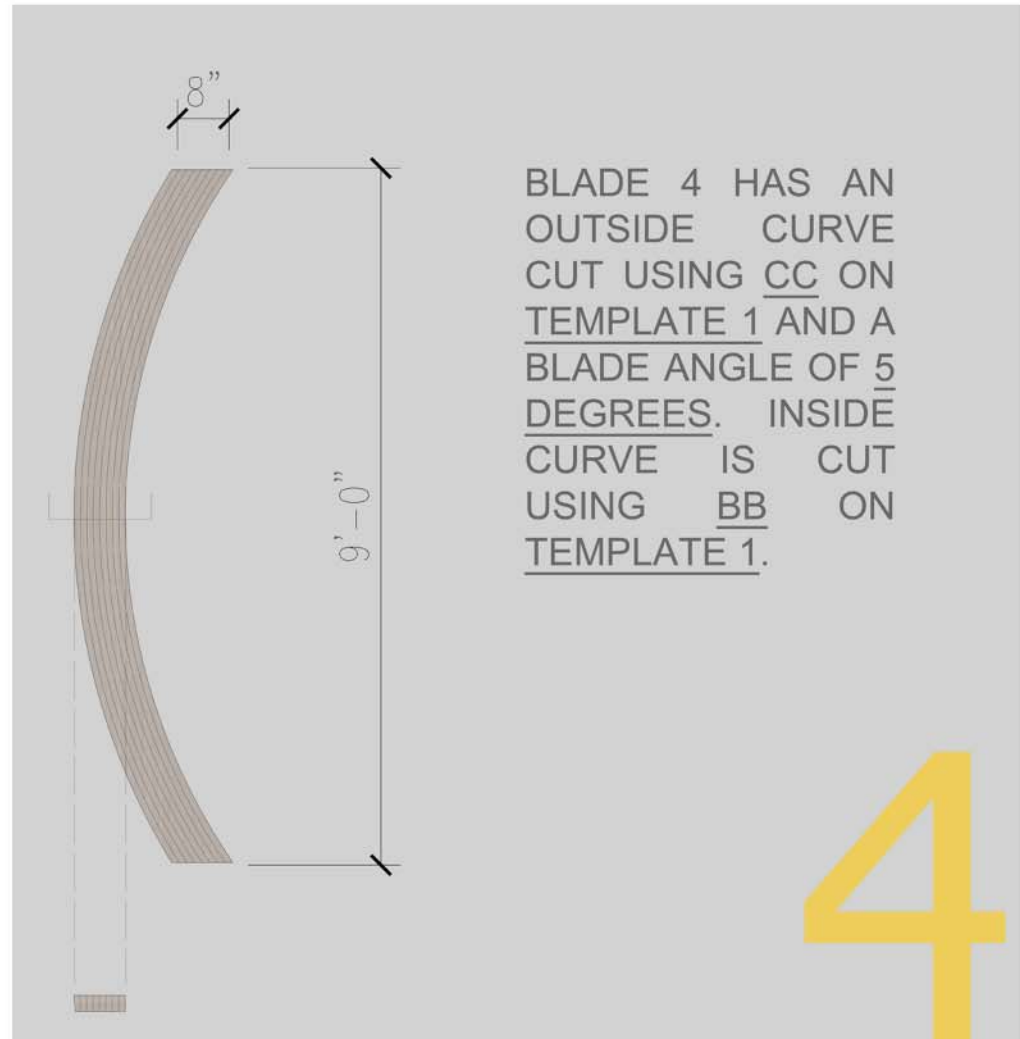
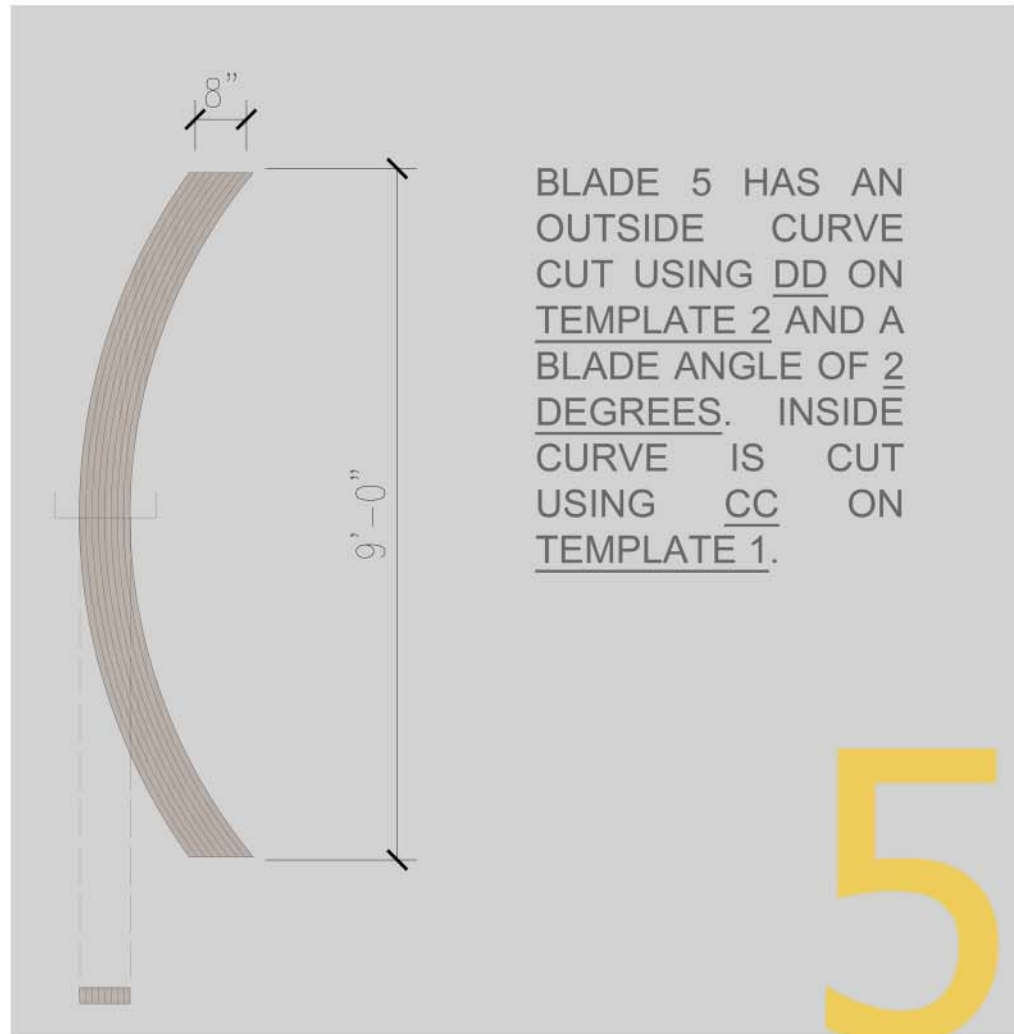
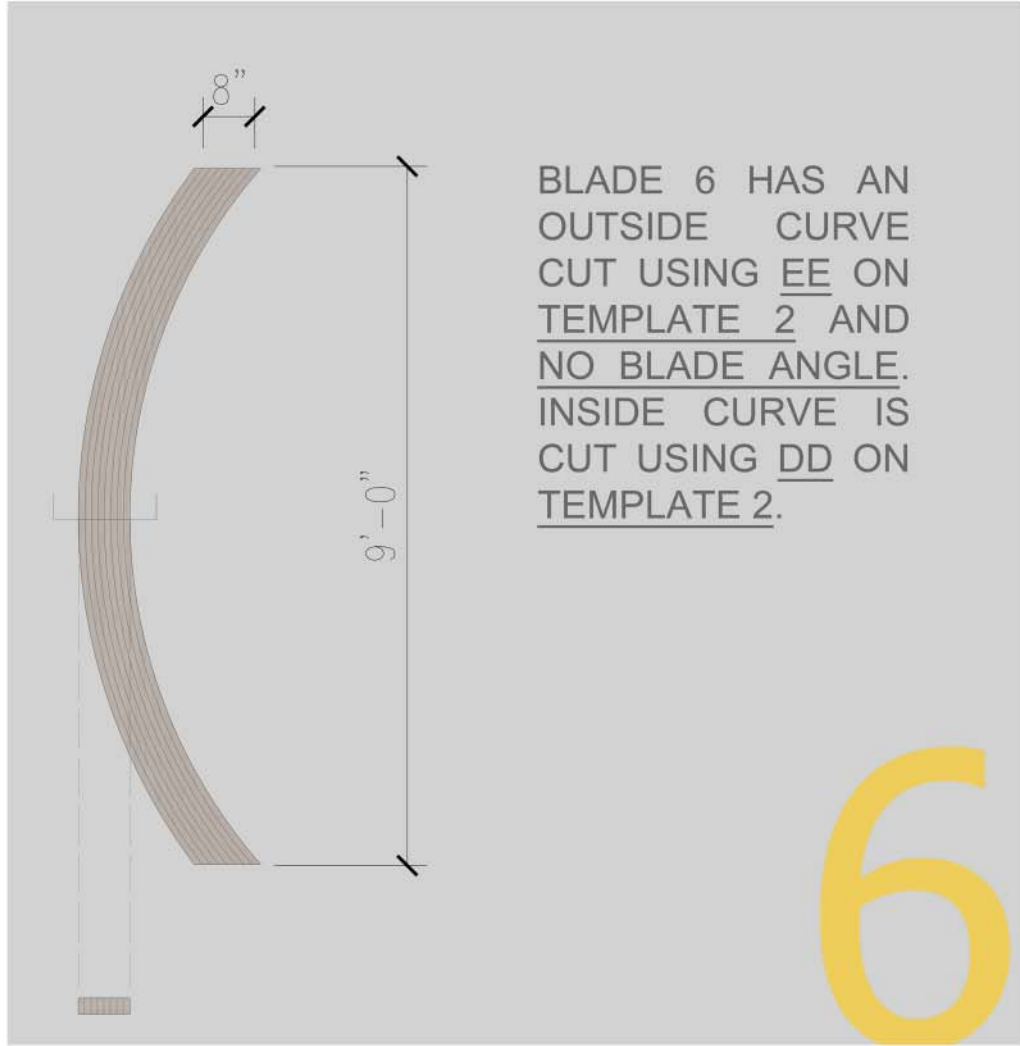


Fig.97.Column 4



BLADE 5 HAS AN
OUTSIDE CURVE
CUT USING DD ON
TEMPLATE 2 AND A
BLADE ANGLE OF 2
DEGREES. INSIDE
CURVE IS CUT
USING CC ON
TEMPLATE 1.

Fig. 98. Column 5



BLADE 6 HAS AN
OUTSIDE CURVE
CUT USING EE ON
TEMPLATE 2 AND
NO BLADE ANGLE.
INSIDE CURVE IS
CUT USING DD ON
TEMPLATE 2.

Fig. 99. Column 6

FINAL ASSEMBLIES AND JIGS

Wall Assembly 4



Fig. 100. Wall Assembly 4



Fig. 101. Wall Assembly 4



Fig. 102. Wall Assembly 4



Fig. 103. Wall Assembly 4



Fig. 104. Wall Assembly 4

One Off Jig 1

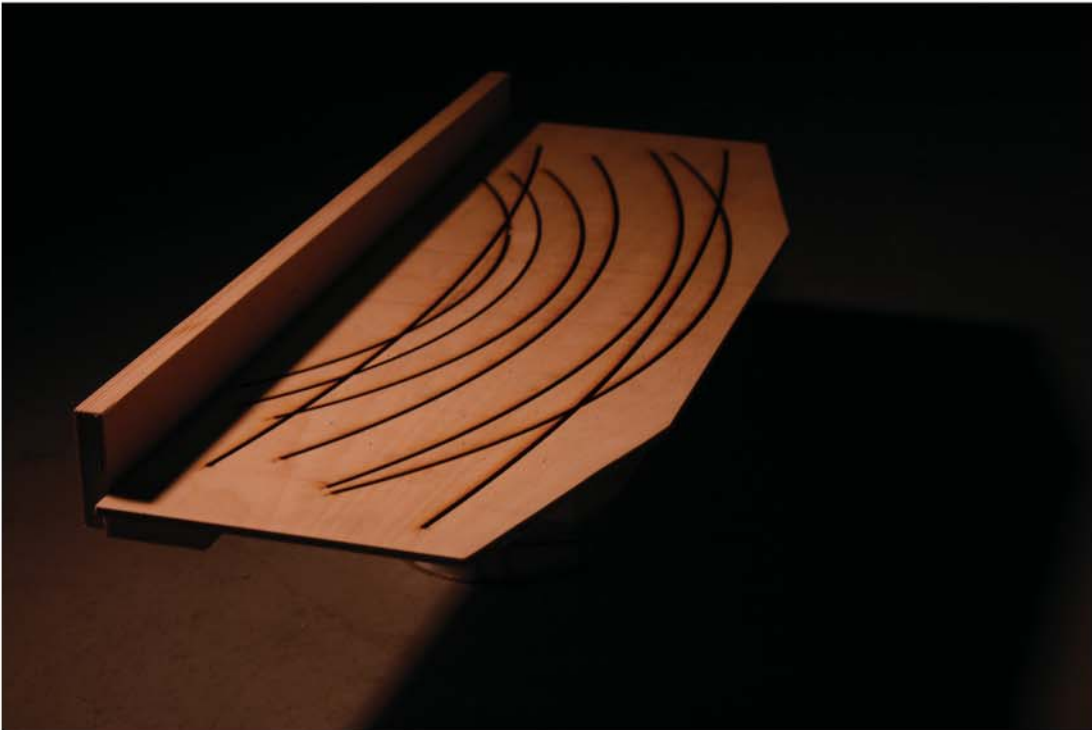


Fig. 105. One Off Jig 1

One Off Jig 2

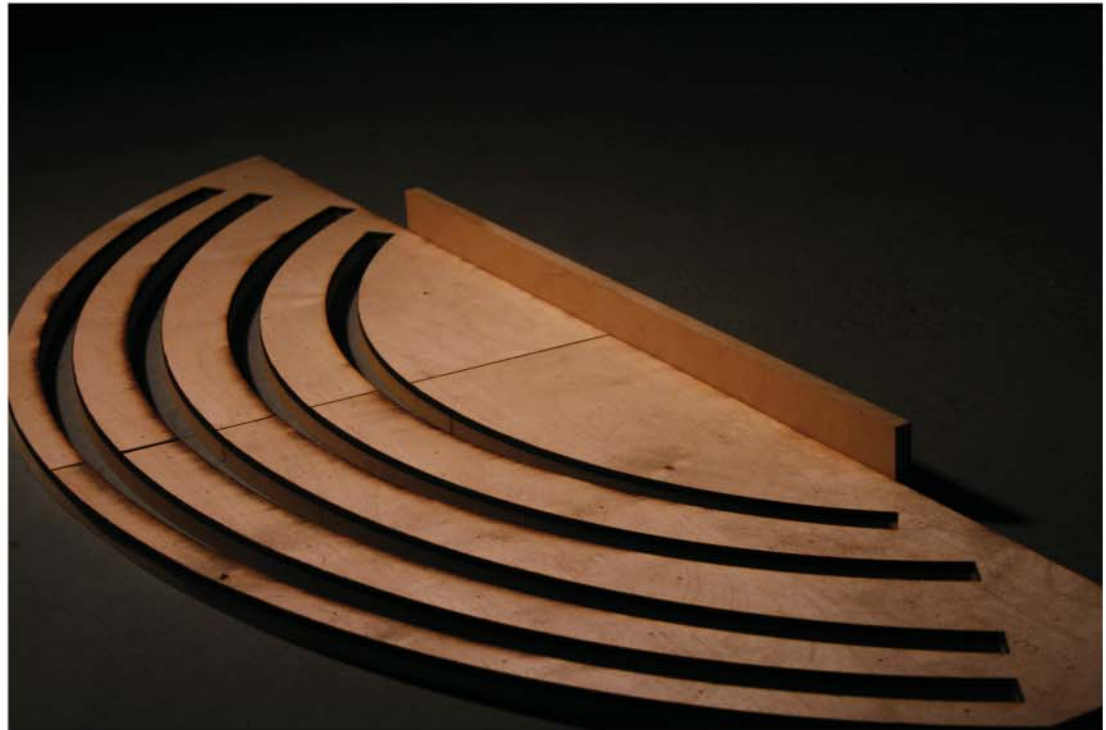


Fig. 106. One Off Jig 2

One-Off Jig 3



Fig. 107. One Off Jig 3



Fig. 108. Jig setting up



Fig. 109. Underside of Jig



Fig. 110. Jig clamped to table saw



Fig. 111. Trammel arm sliding on jig



Fig. 112. Glu Lam ready to be cut

Full Scale Glu Lam Section



Fig. 113. Glu Lam

Wall Section Mock Up



Fig. 114. Wall Section Mock Up



Fig. 115. Wall Section Mock Up



Fig. 116. Wall Section Mock Up



Fig. 117. Wall Section Mock Up



Fig. 118. Wall Section Mock Up



Fig. 119. Wall Section Mock Up

CONCLUSION

This thesis began with an interest in craft and how it plays a part in society, especially in design professions. Beginning in Research Methods, a class taken one semester prior to Thesis I, the education of crafts seemed to be a good starting point to grasp what craft is. Schools of craft, such as the Penland School of Craft, and the North West School of Boatbuilding focused on the crafts, i.e. woodworking, metalsmithing, boatbuilding, sailmaking, etc. These places are essential to preserving the skills and knowledge of whatever crafts are being taught. At Penland, artists and craftsmen from around the world are invited to pass their knowledge onto students who come for one or two week long classes, usually over the summer. While Penland has become a type of retreat to the students, The North West School of Boatbuilding outside of Seattle, Washington acts as an accredited school. Students work towards degrees and move on to working for shipyards and boatbuilders. At the time of studying these places, it was not yet clear how important they would play in the direction and structure of this thesis. As the weeks went by and research shifted from precedent studies to what the thesis would actually turn out to be, a clear diagram illustrating a learning curve exposed the structure the entire thesis (pg.22). While these schools are vital in preserving craft technique, they only allow the student to move within sequence 1. This is not a bad thing, instead it is exactly what a school is meant to do. Sequence 2 in the learning curve diagram happens over years of experience and repetition where the craftsmen learn on his own terms. These schools illustrate the hands-on skills of material based mediums, however, the psychology of craftsmanship is better explained in Richard Sennett's book, "The Craftsman". This reading explained howcraft can be seen in any profession or activity. Vaguely, it is the practice of putting care into whatever the task is afoot. Whether it is cooking a meal, washing a car, or creating a computer script, craft can be thought as genuinely caring about your work. Other precedent studies included furniture designers (pg.13-17) and architects (pg.18-20) that put

both care and thought into their own processes. Vaguely, it is the practice of putting care into whatever the task is afoot. Whether it is cooking a meal, washing a car, or creating a computer script, craft can be thought as genuinely caring about your work. Other precedent studies included furniture designers and architects that put both care and thought into their own processes. These designers, who have years of experience, can be seen on the same learning curve as the students from the craft school only in Sequence 2. Thinking about this learning curve as well as Sennett's definition of craft, a series of exercises were written to better understand the depths of craft (pg.23-35). Exercises 1, 2, and 3 accomplished three things. First, to extend a personal knowledge of craft in general, next, to possibly teach these ideas to students in the future, and last, to define the direction and structure the thesis in its entirety. Before long, it was time to develop a program and define the type of building that was to be the focus of the remaining one and a half semesters. Naturally, a boathouse was thought to be a good choice to complete a thesis based on theories of craft, though nearly any program could have been selected. Boatbuilding, boathouses and the sport of sculling each has its own long history and rich heritage. Designing a community sculling boathouse allowed an in-depth study spanning architecture, craft guilds, construction techniques, etc. A short writing (pg.49) explains the thought process of how this boathouse was designed. In Innovation vs. Pursuit of Perfection, in order for the designer to be a successful innovator, he/she must control themselves and carry out the idea from beginning to end. To be clear, this theory is intended to be practiced in the design of any project by any designer. The boathouse is simply a vehicle to demonstrate these thoughts. The design focused on the process of construction and making. Interested in the methods of boat building and understanding the needs of the program, the walls and structure became the study. By controlling the shift from one idea to another, great thought and development

was put into the construction and design of the wall system. The lessons learned in the creation of these by-products can be used in future products without becoming stagnant as a designer. Making these pieces allow the designer to understand minute factors in the act of construction and making. What was learned in this thesis intended to be a way of designing. Not specifically, the way to design a boathouse or the way to design a wall. It is simply a way to design and innovate. These thoughts can be put into practice in any project. Over time, the designer develops a great understanding of the possibilities and limitations of whatever it is he/she makes. This is the top of the learning curve within sequence 2, where sometimes the only person with the ability to see improvement is the maker himself.

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