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# Creating a Scenic Design Studio

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CREATING A SCENIC DESIGN STUDIO  
An Interactive Qualifying Project Report  
Submitted to the Faculty of  
WORCESTER POLYTECHNIC INSTITUTE  
in partial fulfillment of the requirements for the  
Degree of Bachelor of Science  
by

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Date: E-Term 2008

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# **Abstract**

Creating A Scenic Design Studio documents an IQP for the WPI Drama/Theatre division of the Department of Humanities and Arts, and Masque. The work involved transforming the old scene shop in the Alden Hall sub-basement into a Studio equipped with the tools to create a wide range of high quality scenic elements. Our portfolio provides the academic theatre performance program with instructions and resources to enhance the theory and practice of the art of theatre at WPI.

## **Acknowledgements**

We would like to thank Susan and Jessica for their constant guidance throughout this project. We would also like to thank Terry Pellerin, Dave Messier, and Christopher Salter for their willingness to help, as well as all the students who helped us clean the place out. Most of all we'd like to thank Rick "WonderBoy" Desilets for working on whatever we needed, whenever we needed it, without complaining ever. Additionally, we would like to thank Karen Hassett and Mary Cotnoir for putting up with our constant questions and favors. They always helped us with a smile.



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# Authorship

<b>Project Proposal</b> .....	<b>All</b>
<b>Creating a Scenic Design Studio</b> .....	<b>All</b>
<b>Not Just Hammers and Nails</b> .....	<b>All</b>
<b>Annotated Bibliography</b> .....	<b>Dominic DiGiovanni</b>
<b>Play List</b> .....	<b>All</b>
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<b>Video Acting and Scripting</b> .....	<b>All</b>
<b>Video Editing</b> .....	<b>Rick Desilets</b>
<b>CAD Drawings</b> .....	<b>Paul Ventimiglia</b>

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# Project Proposal

Educational theatre must concern itself with all the technical aspects of the modern stage. Since scenic design and construction is a major part of this, an educational theatre must have and maintain a studio for the design and construction of scenery. The college environment brings together students from different backgrounds and experience to work on theatre productions. Often in college theatre students must work with rigid project timelines, smaller budgets than found in professional theatre, and high expectations of quality. When combined with the normal pressures of student life this creates the perfect recipe for a very stressful work environment. There is an old saying that comes to mind, “A project can be good, fast, or cheap, pick two.” Ideally, a well-run studio would allow for all three. We will create for WPI Drama/Theatre division of the Department of Humanities and Arts, and Masque a space with known standards for safety, tool use, and organization. This in turn will give us the ability to produce high quality products in an efficient and cost effective manner, all-culminating in a new Scenic Design Studio.

We will work to improve three aspects of our studio: safety, organization, and production flow. We will hold safety as the first priority in everything we do in this project. The organization will include creating a detailed and easy to maintain inventory system for all resources, including tools and materials. Ultimately the goal of this project is to create a scenic studio for future campus productions with a thought out flow of production and organized management of resources. Currently there are no official standards and procedures for studio use, including standardized safety procedures. Instituting these for the first time will improve scenic work for current and future generations of WPI theatre. We feel that this project will improve the work by theatre community, providing an educational and fun resource for students and creating entertaining theatre experiences for our audiences.

Here at WPI the students are devoted to theatre and the quality of their work. Ever since the scene shop as we knew it was created in 1992 in conjunction with the renovation of Alden hall, students have been responsible for its use and upkeep. In recent years we have been fortunate to have the Masque Vice President Master Carpenter position filled by passionate, talented students. This is especially important since we have no professional staff to manage the shop. These students pour their time and efforts voluntarily into the theatre going above and beyond what is expected of them. Unfortunately, in the scene shop, too much of their time is wasted navigating the disorganization brought on by the passing years. At college, first time users have no reason to make changes to something they are seeing for the first time. The initial presentation of the shop becomes their initial impression. A messy shop is given a messy treatment. Even one term of this attitude in the leadership could leave the shop in unrecoverable disarray. If incoming students have a clean slate and clear standards, it's likely that they will uphold them for years to come. With the clutter building over time until now, working in the shop has become a burden instead of a pleasure. It is with this long history in mind that we begin our research initiatives.

We will begin our research process by analyzing how WPI Drama/Theatre division of the Department of Humanities and Arts, and Masque have used the scene shop over the years. We have constructed a questionnaire, which will be sent to past Master Carpenters and other students

with extensive shop experience. Their experiences with the shop, both positive and negative, will be of great use to us. We will also bring our combined experiences with theatre construction spaces to bear, from both the old WPI scene shop, and other professional theatre shops. In order to supplement this knowledge, we will learn from theatre literature and other professional and student resources. The Theatre Resource Library (SL 20) contains a plethora of master carpenter projects, in addition to IQPs, MQPs, and Sufficiencies of related content. We will gain outside perspective by reading professional literature. *Technical Theatre for Non-Technical People* by Drew Campbell, *Stock Scenery Construction Handbook* by Bill Raoul, *The Backstage Handbook* by Paul Carter and George Chiang, and *Technical Design Solutions for Theatre* by Ben Sammler and Don Harvey will all provide valuable insight into various industry practices. We will use all of this knowledge to guide our design of the Scenic Design Studio.

Safety is a major requirement for all lab spaces. We will interview members of the WPI staff who are knowledgeable of lab safety procedures. In addition the Internet provides an endless source of general construction safety, as well as theatre specific tips and guidelines. Once the production aspects of our new space have been addressed, we will ensure that lab space will remain a safe environment for the students using it.

For the last 15 years the scene shop has served us as an example of the WPI mission of Theory and Practice. These principles will be our guide as we create a new Design Studio for theatre at WPI.

## Creating A Scenic Design Studio

This project, like most things, started simply enough. It started with a group of people, all with similar interests, skill sets, and a desire for change. When we first approached the old scene shop, we saw a history of frustration, from both our personal experiences and also the collective memory of all its users. It was unorganized, dirty, and much of its space was devoted to storage for items no one could ever remember using. What we saw was potential for greatness.

That room in the Alden Hall sub-basement, despite what we might have felt about the state of things in it, was an excellent space. It's large, when it's empty. It's in a naturally soundproof location. It's cool in the summer and warm in the winter.

We set out to make the shop a better place for everyone. The first step was to get a clean slate. Rebuilding on the rubble of the past, while poetic, is a very shaky foundation. So, we knew that we would have to strip the place down to the floor. It was a daunting effort, to say the least. You never really know how much space things take up until you try and throw them all out, but we were determined. We wanted to see change. We imagined open spaces, redesigned facilities, and a revitalized lab space. So we plugged on. We counted our milestones carefully. When the stock scenery units were all gone, we cheered. When all the walls of the shop were exposed, we congratulated ourselves. When we finally threw everything away, one week and four rollaway dumpsters later, we rested, because we knew the real work was right around the corner.

We all had big plans for the shop. Some of us imagined compact storage, some pictured efficient production flow, and some just wanted a space that was nice and felt good to work in. Unfortunately, none of these goals worked together right out of the gate, and neither did we. How many engineers does it take to screw in a light bulb? Well, if two of them both think they know the best way to do it, that room is going to stay dark. So, we created a groove for ourselves; we would clean the shop in the day, and in the evenings we would all sit and brainstorm. Once we were done cleaning, we began painting, and in the evenings, we would trade floor plans, talk about storage systems, and learn to work together. When we had finished painting, we moved design into high gear, fervently debating the pros and cons of all the possible ways to create our new lab space. And eventually, we came to a consensus.

After that, we were driven. We were ready to create. We had our plan, the details coming together more and more every day, and we could not wait to swing the first hammer blow towards the future. With all this passion, it's interesting that we didn't see the next phase of our project coming sooner. With the spirit of change that we all carried so close to our hearts, how could it not have radiated onto those nearby. And so, our advisors presented us with a challenge: how will we change the world: with saws, hammers, and nails? To create change, you must open people's minds. You must make them think and see new possibilities. It was with our same passion that we were presented with a new way of thinking; we've had a wood shop, why not shoot for a Design Studio?

At first, we were all a bit flustered. A coin on the tracks, even one as valuable as this, can still derail a train. So, we took a step back, put down our hammers, and did exactly what we were charged to inspire: we thought. We thought long and hard about some very esoteric things. How do you inspire? What creates thought? How do we contain a wood shop and a Design Studio in the same space without sacrificing either? For a week, we brainstormed. Eventually we emerged with a spark. An idea, granted, a small one, but something to begin with: what about a table? A big table, a table you can use to collaborate over ideas. Collaboration – well, what about white boards? Whiteboards floor to ceiling. Well how about a drafting table? So a drafting table, and then art supplies, and then better lighting, stools, alternate materials, photos, books, and even toys. All sprung from one table.

And so, we took the table and ran. Well, first we built it, but once we did, we knew it was a good thing. The table was everything we wanted it to be, and it grounded the rest of our efforts, because we could always come back to the key issue: collaboration. How do you open people's minds? You put them in a place where someone can show them something that will blow that mind wide open. Our job wasn't to forcibly inspire, it was to facilitate the exchange of ideas. And the ideas kept coming. We incorporated some, but others we tossed out. And now that we knew, now that we had all found the thing, we were ready.

We dug right into the implementation like men crazy with starvation. We would build all day and into the night. When the going got rough, we would just look around: new storage systems everywhere, brand new work spaces for wood and non-wood alike, and the table, which at this point had grown into a Design Corner. These things refreshed us. We could taste that original passion, that spirit that had driven us to the project in the first place. We were actually changing the space for the better, leaving a lasting legacy for classes to come. We had made the space more functional, better organized, and even repurposed part of it. This knowledge kept us going in the last days, building when the sun came up, and assembling our portfolio until well after the sun went down.

When we were finally finished with the body of work, the actual transformation of the space, we all stepped back. It was done. In many ways, it would never be done. Students will have to protect our space. While we built it, most of us are older students, and the use and care of the studio is going to fall to the people that come after us. Life is constantly changing, and so we must always look towards the future. Someday, a group of equally passionate students will feel that what we have made is outdated, and they will come forward with a project to rebuild the space, and we applaud them, and wish them well.

In a very tangible way, the project was done. We put down our hammers, in their designated and labeled places, we turned off the lights, and we went home to rest, because we all knew, the next big thing was right around the corner.

# Not Just Hammers and Nails

When we first undertook this project none of us realized exactly what it would be. "We'll be done in 3 or 4 weeks," we said at our first meeting. How we were wrong. This section focuses briefly on the path this project took, how our ideas and research came together, and how finally we created a studio, built not just on hammers and nails, but able to adapt to create modern and traditional sets as well as facilitate a free flow of ideas.

## Design Approach

As the old saying goes, "A journey of 1000 miles begins with one step." For us that first step was design, but before we could begin designing, we had to properly assess our needs. We planned on getting input from several sources, making decisions on the information available to us, and proceeding down the best path. Every decision was discussed as a group until we reached consensus. We naturally gravitated towards different areas of the project: Dominic headed the financial shopping and planning, Paul worked on possible floor layouts and construction drawings, and Chris focused on the organizational planning which included the inventory system.

## Research

Our research began with a questionnaire that we sent out to past Master Carpenters and students who had experience in the shop; this questionnaire is included in Appendix B page 31. When we received back responses we were surprised and reassured to discover that so many of the people had similar experiences to ours, and similar visions of what the place could be. With uplifted spirits we now began to look at the books we identified for a more technical source of guidance.

The literature was helpful, although not in the ways we expected. Our annotated bibliography can be found on page 19, and gives a fair description of the books we read. The books did not provide us with any basic knowledge that we were missing. We all knew how to build a flat, no book we read broke any real ground on that. However, they did shine in a few areas. First, some of the books contained great detail. The technical manuals and technical theatre course books contained mountains of information on tool usage, techniques, and professional tips. This information helped to fill in the smaller gaps in our technical knowledge, especially about tools. The bigger things we learned were in the areas of painting and props construction, which appropriately enough is more detailed than general scenic carpentry. Secondly, some of the books provided excellent resources for both technical and simple tasks. One of the more accessible books, the *Stock Scenery Construction Handbook* (Raoul 1998) had references to immensely useful shop built tools, and also simple shop geometry that is used often. On the other end of the spectrum, *The Backstage Handbook* (Carter 1994) is a dense reference manual with limitless information on things from knots, to the bending radius of common woods, to even the pH of most liquids. Finally, some of the books were inspiring. This is a much harder item to encapsulate, but with a Design Studio a now integral part of the space, it



is important to value the esoteric as well as the practical. Some of the books, particularly ones concerned with lighting or drafting, contained excellent color photographs that could be used as inspiration for any designer. Some of the best subject matter came from the all text piece, *The Dramatic Imagination* (Jones 1941). It touches on subjects that affect designers and actors alike, as well as anyone involved with the stage. Once again, it's not something that can be used as a reference material except for pithy sayings. This does not stop it from being an important part of our research process.

## **Budgeting**

For this project we were allotted \$3000 to spend by the WPI Drama/Theatre division of the Department of the Humanities and Arts. Additionally, Masque had put aside \$3500 at the end of the year for us to use. Keeping this hard number, \$6500, in mind we sat down and began to research and plan what tools, resources, and materials we would need to complete this undertaking. Knowing that purchasing new tools was both our highest priority and our most costly we were careful to spend time inventorying and checking the condition of our existing tools. After building a wish list, we then searched for the best deal we could find on many of these items. Fortunately we were able to allot money for the purchase of all the items on that wish list while still having surplus funds for purchasing lumber to stock the studio with. For a more detailed breakdown of how our money was allocated and spent refer to the budget located in Appendix A page 29.

## **The Studio Layout**

The biggest point of contention amongst group members was the new proposed layout of the studio. Having emptied the place out we had a clean slate to start from and were no longer bound by the design of the past. Looking at the space completely empty there were some things that just made sense. When we exposed the studio's window for the first time we all knew that whatever we planned to build could never cover that window. Other things were not so obvious, where do we store flats for example, where do we store plywood? In the end the layout came down to two things, space and usability. Using a model of the studio, we laid out all the elements in 3D CAD software, painstakingly moving them around until we believed we had found the perfect position. We left as much open space as possible without breaking the work flow. Our final studio layout is pictured in Figure 1.



**Figure 1**

A Floor Layout of the Studio

## **Implementation**

After finally agreeing upon a design, we wasted no time setting out plan into action. We began by acquiring or creating the tools necessary to complete the remainder of our project. It was exciting to create a studio for the future, which will affect students many years from now for the better.

### **Building the Studio Elements**

The first job we had to tackle was the physical building of the studio elements. These elements mostly consisted of tables and countertops for adequate design and workspace. Again, we opted to triage our tasks at first focusing on building our selves a work area. The corner stone of this was the Chopsaw cart and the 4'x4' table. These two areas were built first, and then were immediately given a chance to prove themselves as we built the remainder of the elements using them. After creating a workspace for ourselves, we moved our attention towards storage, something that had never been addressed effectively in the previous iteration of the shop. With these in place, we could finally concentrate on the real purpose of this project, expanding into new territory beyond the hammers and nails that had built the studio.

## The Design Corner

The Design Corner is the center of our new focus on collaborative set design and alternative design approaches. The main section of the area is a large 4 foot by 8 foot table pictured in Figure 2. This table provides both a central area to meet and collaborate, as well as storage for various tools and resources for experimentation. One of the more notable features of the design table is an accurate 1/20<sup>th</sup> scale model of the Little Theatre. We envision this model surrounded by students using it to share ideas for sets in many different styles. Apart from the design table the Design Corner includes a wall covered in white boards where students can draw out ideas and a desk where we hope to have a computer that could be used to design sets digitally using computer aided design programs.



**Figure 2**

The Design Table

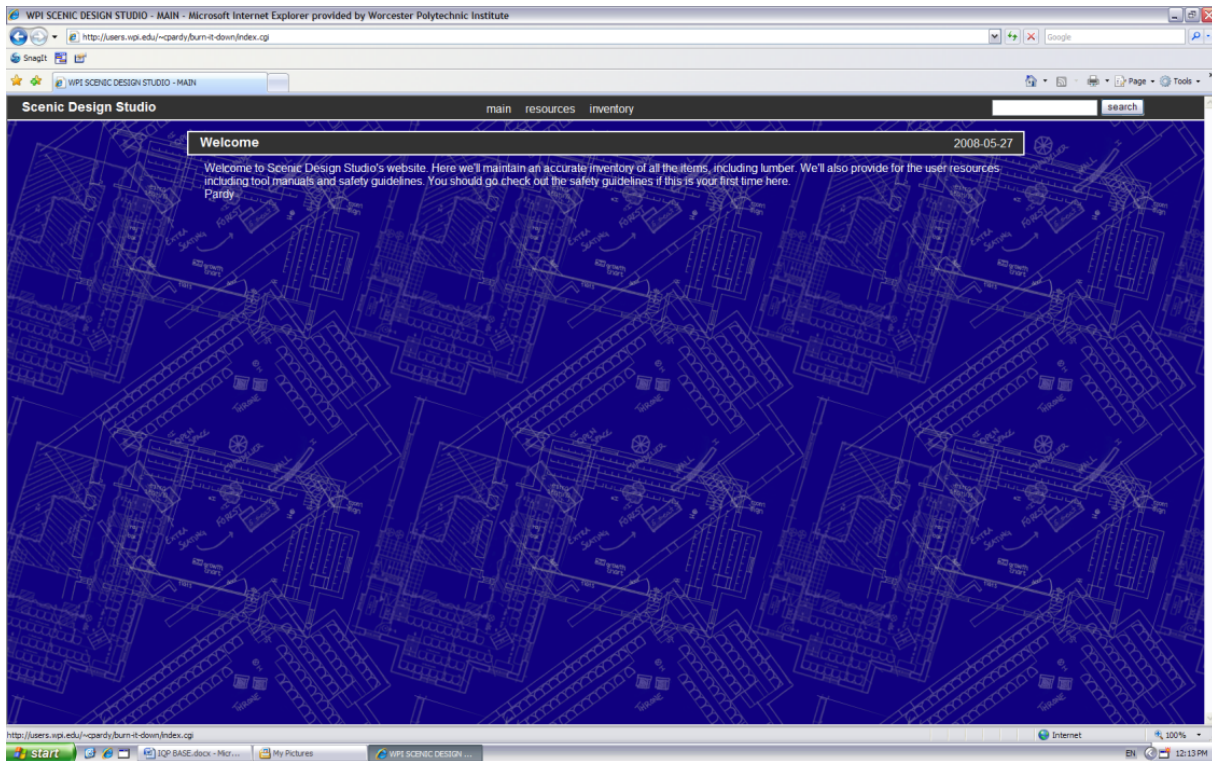


**Figure 3**

The Labeled Cabinets

## **Organization**

One of the major issues that we identified with the previous shop is that no real organization system existed for hardware, tools, or lumber. From the look of it, some attempts had been made but all had fallen into disarray or disuse over time. For the new studio we vowed that we would never let our system fall into that state. To that end we created a logical and easy to maintain system for sorting our hand, power, and pneumatic tools. This would allow students working in the studio to quickly and easily find the right tool for the job rather than hunting around, and more often than not settling for a less-than-perfect solution. Figure 3 shows our new under-bench cabinets that have been clearly labeled with their contents, making the entire studio less confusing. To further the organization, we also created an easy to use web inventory system. Now anyone wishing to design a set can find out quickly the materials that the studio has on hand, as well as any associated costs or special notes. Currently this website, pictured here in Figure 4, is hosted at: [www.wpi.edu/~cpardy/burn-it-down](http://www.wpi.edu/~cpardy/burn-it-down) however it is hoped that it will be incorporated somewhere into the Masque and Drama Theatre websites.



**Figure 4**

The Website for the New Scenic Design Studio

On the related subject of organization, the issue of administration comes to light. In the end, the Design Studio's care and maintenance will still fall with the Humanities and Arts Department Division Drama/Theatre work-study position of Scene Shop Liaison. However, the studio will also be in the hands of numerous master carpenters throughout the WPI academic theatre season, including the elected Masque Master Carpenter. As such, these three positions must work together to maintain the current state of the Design Studio. The first thing we suggest is that there is one of these people in the studio whenever work is being done. Without someone to enforce the rules, someone with experience who can hopefully teach as well, it's unlikely that the level of skill and care that we currently enjoy will continue. On a more practical note, people are not likely to police themselves, and so it is necessary to have someone in charge. Safety is of course, the primary concern with this, and the different Master Carpenter's would be expected to uphold all of the tool safety procedures (see Appendix F page 64). As we've pointed out, one of the biggest improvements to the studio is its organization, and it will once again fall to these key positions to keep that organization worthwhile. The Master Carpenter for any given show would naturally be in charge of day to day clean up, which should include putting all of the tools back in their proper places, and also a thorough sweep and vacuum of the floor and work areas. After a show's production run, the Master Carpenter and also the Scene Shop Liaison should be in charge of a thorough cleaning of the studio. Sweeping and vacuuming again are of the essence, as well as putting everything away. This would also be an excellent time to mop, if possible, and



make inventory notes, seeing what has run low, gone missing, or broken, and what larger studio maintenance needs to be completed before the next production starts.

It is to the ends of upholding these goals that we have proposed a Scenic Design Studio Terms of Use Agreement, to be kept on file in the Salisbury Labs Resource Library along with the Little Theatre administration forms. This can be found in Appendix G on page 76.

## **Results and Recommendations**

With the project finished, it is time to look back and review the results of the hours spent. Having used many of the elements we have built already, we can confidently say that our project has met the goal we set out to achieve. The new studio is a pleasure to work in. Tools are always at hand, and flat work areas abound. Building the first flat in the new studio, while not a break from hammers and nails, did in fact demonstrate that we had achieved the trinity of our perfect studio: good, fast, and cheap. However it is from these drastic improvements that we see there is still room to move forward. For the immediate future we would make the following recommendations-

-Much of our stock scenic pieces were in such a state of disrepair that they needed to be disposed of; we recommend constructing and stocking the studio with 6 new flats, 6 new platforms, and 4 new folding masking flats. With the exception of one flat we have already made these 16 pieces of scenic stock will need to be built.

-The large 60 bin hardware cabinet we ordered has been backordered by the manufacturer. When it arrives our hardware should be removed from its temporary storage and sorted carefully into the new drawer system with labels.

-Many of our other tool orders needed to be paid for with personal credit before reimbursement from the school. Several of these orders were therefore placed late and will be arriving after our project is completed. They should be installed, and their manual data added to our large technical binder.

-The floor of our studio has been painted on, glued on, or abused to the extent that it needs to be re-painted. We have purchased concrete floor paint for this purpose. The paint takes over 3 days to dry, so it should probably be applied when no one needs to use the studio for those days.

-One of our visions for the studio was to add a computer to allow students to design sets digitally with 3D CAD software. Numerous steps have been taken to move this process forward, but two major road blocks have been hit. The first is that a network port would be need to be added to the Design Studio, and after a considerable hassle with NetOps, Professor Susan Vick said that she would handle that end. The second road block is that there is no separate source of funding for a computer, nor do our current funds for this project have enough money for a decent computer. We all feel that this would be a much needed addition to the studio, although clearly also one of the hardest to organize.

-While the design and experiment table is complete, there will always be room to modify and expand the resources we provide to students. The first thing we would add is \$30 - \$60 of black Legos for creating scenic design concepts for the Little Theatre scale model.

-We had also envisioned the studio providing all the general-purpose common lumber a Master Carpenter could need. While the places to store this wood have been created, they have not yet been filled with a full ready stock.

-The Website while technically complete needs to be populated with the inventory of the studio, as well as be moved to a more permanent home.

# Annotated Bibliography

Arnold, R.L. (1994). Scene Technology 3<sup>rd</sup> Edition. Englewood Cliffs, NJ: Prentice Hall.

An in-depth overview of theatre technology and most of its facets. It describes in great detail every tool and material one could ever use in theatre construction. Its instructional elements are in some chapters decent, and in some chapters absent. The section on shop design and maintenance was very well done, along with its chapter on theatre selection and analysis. However, it is quite out of date as a technical theatre manual. Its references to computers as a new thing, and its insistence on nails as the primary construction method for lumber were off putting. A new edition of this book would have to be reviewed to get a better analysis.

Rowe, C.P. (2007). Drawing & Rendering for Theatre. Burlington, MA: Focal Press.

Beyond being a manual for drawing and rendering for theatre, this book is a whole course in art, from the basics to advanced techniques. Its basic introduction and growth from there make it an excellent encapsulated instruction, but reduce its usefulness as a reference. The chapter on color does stand out as an external reference. However, it focuses mostly on the techniques of drawing and painting, and not necessarily on the process of design or theatre in general. The pictures inside are of excellent quality in some cases very inspiring.

Block, D., Parker, W.O. & Wolf, C.R. (2003). Scene Design and Stage Lighting 8<sup>th</sup> Edition, Belmont, CA: Wadsworth/Thomson Learning.

This book acts as an updated replacement for Arnold's Scene Technology. The subject matter is almost identical, sometimes using the same images in fact, but the subject matter is covered far better, and is far more modern. It is the only book reviewed to put major emphasis on the design process and realization of design. That alone sets it apart as a manual for designers as opposed to builders. It remains open minded about materials and design styles, and the addition of color photos make it an excellent resource.

Sweet, H. (1995). Handbook of Scenery, Properties, and Lighting (Volume 1: Scenery and Props), Needham Heights, MA: Allyn & Bacon.

This book is intended as an instructional manual. It does briefly discuss design, but not as well as Block et al. Its strength comes from its paint section, which clearly explains multiple techniques for achieving similar paint effects. The color section is good, with emphasis on color selection and color mixing. The properties section is also strong, since it is the largest and one of the most instructional of the selected readings. A newer edition would be a boon to this book.



Raoul, B. (1998). Stock Scenery Construction Handbook, Louisville, KY: Broadway Press.

Well written, and very easy to read. Raoul writes a very personal manual, with fun but clear illustrations. It is very useful as an instruction manual for some of the most basic scenery units in the theatre, including flats, platforms, and modifications thereof. One downside to the book is that it focuses mostly on “soft cover” flats. Its use as an actual construction guide does make it desirable. As a bonus, instructions are included for simple shop made shop tools, and a handy illustrated guide to shop math and descriptive geometry techniques.

Carter, P. (1994). The Backstage Handbook, Louisville, KY: Broadway Press.

A top shelf resource manual. It contains well illustrated diagrams and pictures of many tools, construction situations, and other frequently encountered theatre situations. There is little writing, and it is not intended for instruction. One downside is that some of the book is taken up with quick math charts for trigonometry, something slightly outdated with modern pocket calculators. Also, the typeface can be hard to read for some. As a design and construction resource, it is still second to none.

Sammler, B. & Harvey, D. (2002). Technical Design Solutions for Theatre (Two Volumes), Burlington, MA: Focal Press.

A collection of empirically stage tested solutions for common problems found in the modern theatre. These volumes were compiled from single focus articles in *The Technical Brief Collection*, a publication of the Yale School of Drama. Both volumes cover large amounts of ground, from sets, costumes, and lighting with many sub categories in each. Some of the articles are very useful, and present interesting solutions or additions to the theatre process. However, much of the book is spent discussing issues that are quite specific, and may not be encountered in every theatre. Additionally, much of the book is geared towards a proscenium theatre with a large rigging system, and thus does not apply to the WPI theatre environment. A questionable addition to a WPI reference library.

Campbell, D. (2004). Technical Theatre for Nontechnical People, New York, NY: Allworth Press.

An excellent introduction to the world of technical theatre. Campbell uses his extensive professional experience to give an overview of all the many fields of backstage work. This book is not a construction manual, and does not claim to be. It mentions in passing many things, but does not instruct. It is well written, and reads very easily. In terms of a resource, all students of the theatre, technical or otherwise should read this book.

Jones, R.E. (1941). The Dramatic Imagination. New York, NY: Theatre Arts Books

An inspiring and engaging read. Jones covers some of the higher themes of designing for the theatre, a bit of history on the subject, and then a specific section on lighting. The majority of the book is musings on the theatre in general, and is written with an excellent voice. It is in no means a reference material, but is a good read, for any theatre participant.

Brook, P. (1968). The Empty Space. New York, NY: Touchstone

Another book of musings on the nature of theatre, specifically, its deadly, awful parts, the holly enlightening moments, the rough passionate elements, and its immediacy and effectiveness as a revolutionary art form. Inspiring, but with very little to say about theatre technology, and in some ways, a rejection of it.

# Play List

## Dramatic Literature Studied

Actors Theatre of Louisville	<i>Heaven and Hell (On Earth): A Divine Comedy</i>
Anderson, Erica M.	<i>Floral Arrangements</i>
Anonymous	<i>Everyman</i>
Becket, Samuel	<i>Waiting for Godot</i>
Bogosian, Eric	<i>Suburbia</i>
Čapek, Karel	<i>R.U.R.</i>
Carlson, Tofer	<i>Glow</i>
Castonguay, Amy	<i>The Punisher: The Play</i>
Christie, Agatha	<i>The Mousetrap</i>
Ciaraldi, Michael J.	<i>First Draft</i>
	<i>Hunted</i>
Darensbourg, Catherine	<i>Attic</i>
	<i>French Vanilla</i>
	<i>Prime Time Crime: Teal Version</i>
Darensbourg, Catherine, Edmund James Massa, and Christopher Osborn	<i>Sugar and Spite</i>
Dickens, Charles	<i>A Christmas Carol</i>
DiGiovanni, Dominic	<i>Trusted Download</i>
Durang, Christopher	<i>The Actors Nightmare</i>
	<i>Sister Mary Ignatius Explains It All For You</i>
Elder, Lonne	<i>Ceremonies in Dark Old Men</i>
Feller, Samuel Frank	<i>Living With Them</i>
Frayn, Michael	<i>Noises Off</i>

Gilbreath, Dan and Edmund James Massa	<i>Space Station Deluxe</i>
Giraudoux, Jean	<i>The Madwoman of Chaillot</i>
Greenberg, Richard	<i>Take Me Out</i>
Guare, John	<i>Marco Polo Sings a Solo</i>
	<i>A Few Stout Individuals</i>
	<i>Six Degrees of Separation</i>
Guirgis, Stephen Aldy	<i>The Last Days of Judas Iscariot</i>
Harrower, Shannon (Haz)	<i>Bower Bird: AKA Crazies in Love</i>
	<i>The Princess and the Body Snatchers</i>
	<i>Raccoon a la Mode</i>
	<i>Sympathy for the Devil Inc.</i>
	<i>Union Station</i>
Hansberry, Lorraine	<i>A Raisin in the Sun</i>
Hart, Norman Philip	<i>An Inspector Answers</i>
Irving, Washington	<i>The Legend of Sleepy Hollow</i>
Ives, David	<i>Don Juan in Chicago</i>
	<i>Speed-the-Play</i>
	<i>Time Flies</i>
Jones, Rolin	<i>The Intelligent Design of Jenny Chow</i>
Johnson, James	<i>Something in the Void</i>
Kaufman, Moisés	<i>Gross Indecency: The Three Trials of Oscar Wilde</i>
	<i>The Laramie Project</i>
	<i>The Peoples Temple</i>
Kennedy, Adrienne	<i>Funny House of a Negro</i>
Knott, Frederick	<i>Wait Until Dark</i>

Kopit, Arthur	<i>Wings</i>
Lapine, James	<i>Twelve Dreams</i>
Lawrence, Jerome and Robert Edwin Lee	<i>Inherit The Wind</i>
Lindsay-Abaire, David	<i>Wonder of the World</i>
Lozada, Amanda	<i>Island of the Cat People</i>
MacLeish, Archibald	<i>JB</i>
Mamet, David	<i>American Buffalo</i>
	<i>Glengarry Glen Ross</i>
	<i>Sexual Perversity in Chicago</i>
	<i>Speed-the-Plow</i>
	<i>The Voyage Inheritance</i>
Martin, Steve	<i>Picasso at the Lapin Agile</i>
	<i>The Underpants</i>
Massa, Edmund James	<i>Love Love Love: Three Stories of Love</i>
McCauley, Robbie	<i>Sally's Rape</i>
Medoff, Mark	<i>Gunfighter: A Gulf War Chronicle</i>
Miller, Arthur	<i>All My Sons</i>
	<i>Death of a Salesman</i>
Nakama, Adam	<i>A Comedy of Politics</i>
	<i>How to Meet Girls, for Voice Actors</i>
	<i>Walt and Wilde</i>
Nowack, Amanda Jean	<i>Stuck in a Moment</i>
O'Donnell, Dean	25
	<i>Footsie</i>
	<i>Home</i>
	<i>In Bad Taste</i>

O'Neill, Eugene	<i>Long Day's Journey Into Night</i>
Osborne, Christopher	<i>Hangman</i>
Parent, Jesse	<i>Daddy</i>
Parks, Susan-Lori	<i>Topdog/Underdog</i>
Pavis, Richard	<i>Infected</i>
	<i>Sudden Silence, Sudden Heat</i>
Pavis, Sarah	<i>Perspective</i>
	<i>Shot in the Heart</i>
Pawley, Thomas	<i>The Tumult and the Shouting</i>
Rahman, Aishah	<i>The Mojo and the Sayso</i>
Reddin, Keith	<i>All The Rage</i>
Roberts, Brian and Cecilia Servatius	<i>Holy Spam</i>
Rudnick, Paul	<i>I Hate Hamlet</i>
Servatius, Herman	<i>Situation Critical</i>
Simon, Neil	<i>Fools</i>
	<i>God's Favorite</i>
Simpson, Maxwell	<i>Fortune Cookie</i>
Shaffer, Peter	<i>Black Comedy</i>
Shakespeare, William	<i>A Comedy of Errors</i>
	<i>All's Well that End's Well</i>
	<i>As You Like It</i>
	<i>Coriolanus</i>
	<i>Hamlet</i>
	<i>Julius Caesar</i>
	<i>Macbeth</i>
	<i>The Merchant of Venice</i>

	<i>A Midsummer Night's Dream</i>
	<i>Much Ado About Nothing</i>
	<i>Othello</i>
	<i>Richard III</i>
	<i>Romeo and Juliet</i>
	<i>The Taming of the Shrew</i>
	<i>The Tempest</i>
Shepard, Sam	<i>Curse of the Starving Class</i>
Shinn, Christopher	<i>Where Do We Live</i>
Sophocles	<i>Antigone</i>
	<i>Oedipus Rex</i>
Spewack, Sam and Bella	<i>Boy Meets Girl</i>
Stoppard, Tom	<i>15-Minute Hamlet</i>
Taylor, Steven S.	<i>Black Pajamas</i>
Thomas, Brandon	<i>Charley's Aunt</i>
Unknown	<i>Copenhagen</i>
Vassella, Steven	<i>To Stop</i>
Wilder, Thornton	<i>Our Town</i>
Williams, Tennessee	<i>A Streetcar Named Desire</i>
	<i>The Glass Menagerie</i>

## **Musicals**

*1776*

*A Funny Thing Happened on the Way to the Forum*

*Aida*

*Anything Goes*

*Beauty and the Beast*

*Cats*

*Damn Yankees*

*Doctor Dolittle*

*Evita*

*Fiddler on the Roof*

*Grease*

*Guys and Dolls*

*H.M.S Pinafore*

*Into the Woods*

*Iolanthe*

*Jekyll and Hyde*

*Jesus Christ Superstar*

*Joseph and the Amazing Technicolor Dreamcoat*

*The King and I*

*Les Misérables*

*Lion King*

*Merrily We Roll Along*

*The Mikado*

*Miss Saigon*

*The Music Man*



*The Nutcracker*

*Once Upon a Mattress*

*Phantom of the Opera*

*Pippin*

*The Pirates of Penzance*

*Rent*

*Ruddigore*

*Spamalot*

*Starlight Express*

*Sweeney Todd, the Demon Barber of Fleet Street*

*West Side Story*

*Wicked*

*The Yeoman of the Guard*

# Appendices

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# Appendix A

## Itemized Budget

Item	#	Cost
<i>Northern Tool</i>		
Quantum 60 bin (n.tool)		208.99
18v dewalt recon. (n.tool)		150
4 Pack of Tape Measures (n.t.)		12
<i>Shipping</i>		6.2
<b><i>Northern Tool Subtotal:</i></b>		<b>377.19</b>
<i>Delta Tool</i>		
Delta Dust Collector 50-760		330
Delta Table Saw 36-750B		1250
<i>Shipping</i>		0
<b><i>Delta Tool Subtotal:</i></b>		<b>1580</b>
<i>Black &amp; Decker</i>		
18v B&D w/2 batt and charger	6@ 49.99	299.94
<i>Shipping</i>		29.99
<b><i>Black &amp; Decker Subtotal:</i></b>		<b>329.93</b>
<i>American Science and Surplus</i>		
speed square (AS&S)	4 @ 1.25	5
saftey glasses (AS&S)	6 @ 2.50	15
<i>Shipping</i>		6.95
<b><i>AS&amp;S Subtotal</i></b>		<b>26.95</b>
<i>Home Depot</i>		
Dewalt Angle grinder D28110		70
100' Tape		15
Gloves (2 pair)		10
¼ Air Ratchet		30
Hammers		35
Vice Grips		20
Every Wrench Ever		20
Clamps	4@10	45
Sawzal Blade Kit		30
Compressor Deal		280
Saw Blades	3@40	120
T-50 Stapler	2@20	40
Chop saw		680
Palm sander pads		15
Impact Driver w/2 Batt.		200
#2 philips bits		9

Screw buckets	3@45	135
Pencils		10
<b>Item</b>	<b>#</b>	<b>Cost</b>
Ryobi Drill Press		170
<b>Home Depot Subtotal:</b>		<b>1934</b>
<i>Lumber</i>		
3/4 Ply	12at33	396
1/2 Ply	8at23	184
Luon	12at11	132
2x4x8	100at2.15	215
2x6x8	6at4	24
4x4x8	12at11	132
Pine	100at2.15	215
<b>Lumber Subtotal:</b>		<b>1298</b>
<i>Walmart</i>		
drawing supplies	misc	116
<b>Walmart Subtotal:</b>		<b>116</b>
<i>AC Moores</i>		
model supplies	misc	60
drawing supplies	misc	90
<b>AC Moores Subtotal:</b>		<b>150</b>
<i>Target</i>		
model supplies	misc	18
<b>Target Subtotal:</b>		<b>18</b>
<i>Lowe's</i>		
Firestorm Hammer Drill	1	86
<b>Lowe's Subtotal:</b>		<b>86</b>
<i>Staples</i>		
design supplies	misc	70
organization tools	misc	100
<b>Staples Subtotal:</b>		<b>170</b>
<b>Total</b>		<b>6086.07</b>

# **Appendix B**

## **Research Questionnaire with Responses**

### **Questionnaire**

The following is a copy of the questionnaire that we sent out to past Master Carpenters and students who have shown interest.

Hey you guys,

This summer we've finally gotten around to tearing down the scene shop and starting fresh. You're both past master carpenters in one way or another, and so we wanted to get your opinion: What would you change about the shop?

I know you could probably go on at great length if you had to, and if you feel like it, go ahead. Short answers will also be accepted.

Also, if you had to prioritize a list of things to buy, what would come first? For kicks, lets say you have a budget of \$6500. once again, detail is fine, as is no detail.

Thanks for any input you can give. You'll be helping to build a new and better scene shop.

~Dominic (and the rest of the IQP crew)

# Responses

These are some of the responses to our questionnaire. To privacy reasons names and contact information has been removed.

Dom,

-firstly I would throw out virtually everything that is crappy or you feel is no longer necessary (there is a lot of junk in there).

-I don't know the status of the flats but my guess is we could do with some new ones.

-we could do with a better way to store tools (although it would be hard to get people to put them away) maybe something with drawers.

-I think something we absolutely need is a new table saw, i know bosch makes a good one that is portable so we could break it down and set it up in the little for easier builds

-something nice to have would be a drill press (not a necessity)

-a new and better lumber rack might easier

if you want to discuss potential layouts maybe we can meet up at woopi and talk it through

----

Some things nice to replace:

table saw

shop vacuum

corded drills (2)

A new way to deal with the the saw dust from the table arm saw.

I don't know if there is a good way to organize it, but it would be nice to have an open area to work/assemble things

Don't forget amount that money there is some from masque that can be used.

I hope these thoughts are useful.

----

Hey Dom!

These are all just suggestions of things I can come up with on the top of my head. I'll try to avoid the obvious ones, and I'll go into more detail when I see you next and I no longer have to pay for the internet. This are just some of the things on my dream list:

-chargers set up in the cabinet so they can be charged and locked up at the same time.

-new, nice drills and the chargers should have surge protection and extra batteries for each.

-stock flats that aren't covered in paint. I'd say at least 10 at 8 feet and 4 at 2 feet. More is always fine with me.

-stock platforms. I think I sent you an email about that awhile ago for what we will need for the A term show, so if you are going to throw out more than that, please keep them in a back corner and I'll throw them out after the show because I'd like to actually make a profit this term.

-new table saw, of course.

-please throw out all of the screw. I mean all of them. And then buy one bucket of the 1 1/4, 1 1/2, and like 2 inch screws. Oh, maybe keep the small screws, I think they are an inch, that we have too, but all the other ones are such a mess right now it's not worth keep screws after we use them for shows. This is just my opinion, but I think we should just throw them all away after every show. I mean they are so effing cheap anyways there is no reason to try to save money reusing them because they never get sorted right.

-pliers. We need a good pair of all the types, like needle nose and the other kinds.

-phillips head screw drivers. I think we only have one hand one right now. I have no idea where they all went, but yeah, we could use some new ones.

-OMG, you could spend a day going throw all of that damn paint. Don't forget about the pain under the radial arm saw. I think the majority of it can be thrown away, but PLEASE take to plant services and throw it away the correct way. Since you obviously have the money, there is no reason to pollute the environment in the process. Pay to get it disposed the correct way. I can't stress that enough.

Okay, I'm rambling on now. I'm sorry because I was hoping to keep it short, but you know me. I'll be home in a week. Have fun tearing that sucker apart. Were you able to pick up the chop saw... were there any difficulties with that? Let me know!

Thanks,

----

# Appendix C

## Detailed Calendar and Log of Hours

### Friday, May 2<sup>nd</sup>

First meeting:

-fill out IQP forms

-discuss overall goals of the project.

Hours:

Paul	Dom	Chris
3	3	3

### Saturday, May 3<sup>rd</sup>

Begin working on project proposal

Hours:

Paul	Dom	Chris
4	4	4

### Sunday, May 4<sup>th</sup>

Finish writing first draft of project proposal

Hours:

Paul	Dom	Chris
3	3	3



**Monday, May 5<sup>th</sup>**

Two dumpsters available for the day

Begin cleaning out the scene shop

-large debris removal

Proposal due at 5

Hours:

Paul	Dom	Chris
10	10	9

**Tuesday, May 6<sup>th</sup>**

Continue to disassemble items in scene shop for disposal

Meet with Susan to review project proposal

Hours:

Paul	Dom	Chris
9	9	9

**Wednesday, May 7<sup>th</sup>**

Continue to disassemble items in scene shop for disposal

Hours:

Paul	Dom	Chris
9	9	9

**Thursday, May 8<sup>th</sup>**

Two dumpsters available again for the day

Finish large debris removal

Begin and complete small debris removal

Meet with Susan and Jess to discuss progress

Hours:

Paul	Dom	Chris
10	13	13

**Friday, May 9<sup>th</sup>**

Start detail cleaning of the shop

-mopping and sweeping

-Dusting cabinets and air ducts

Hours:

Paul	Dom	Chris
9	9	9

**Saturday, May 10<sup>th</sup>**

Finish detail cleaning

Hours:

Paul	Dom	Chris
7	10	10

**Sunday, May 11<sup>th</sup>**

Day off

Chris gone until Monday May 19<sup>th</sup>

Hours:

Paul	Dom	Chris
2	0	0

**Monday, May 12<sup>th</sup>**

Start painting shop walls

Hours:

Paul	Dom	Chris
7	8	0

**Tuesday, May 13<sup>th</sup>**

Finish painting shop walls

Meet with Susan and Jess to discuss progress and recap cleaning

Hours:

Paul	Dom	Chris
8	8	0

**Wednesday, May 14<sup>th</sup>**

Begin floor plan design

Begin shopping research and budgeting

Begin revising project proposal

Chris begins researching Inventory Website

Hours:

Paul	Dom	Chris
9	10	1

**Thursday, May 15<sup>th</sup>**

Continue design, budget, and writing work

Hours:

Paul	Dom	Chris
8	8	0

**Friday, May 16<sup>th</sup>**

Continue design, budget, and writing work

Chris Continues researching webpage

Hours:

Paul	Dom	Chris
7	8	1

**Saturday, May 17<sup>th</sup>**

Continue design, budget, and writing work

Hours:

Paul	Dom	Chris
8	8	0

**Sunday, May 18<sup>th</sup>**

Continue design, budget, and writing work

Hours:

Paul	Dom	Chris
7	8	0

**Monday, May 19<sup>th</sup>**

Finish second draft of proposal

Finish initial budget

Finish initial floor plan design

Hours:

Paul	Dom	Chris
9	8	0

**Tuesday, May 20<sup>th</sup>**

Chris returns, begins writing inventory website

Safety Meeting

Meet with Susan and Jess to discuss proposal

-present potential calendar

-present floor plan

-present budget

Work on shop construction drawings

Hours:

Paul	Dom	Chris
9	8	14

**Wednesday, May 21<sup>st</sup>**

Prepare and mail out purchase orders

Final calendar due at 5

Begin brainstorming studio design elements (long term goal)

Hours:

Paul	Dom	Chris
9	9	15

**Thursday, May 22<sup>nd</sup>**

Meet with Susan and Jess

-present final calendar

-discuss where we are headed with the final outcome

-present potential studio element plans

Money transfer from Masque

Home Depot run for new tools

Hours:

Paul	Dom	Chris
7	10	16

**Friday, May 23<sup>rd</sup>**

Dom leaves until June 2<sup>nd</sup>

-begin writing final portfolio outline.

-presents outline of all things requiring safety information

-begin writing safety guidelines for main binder

Finish carpentry component designs (work areas, wood storage areas)

Hours:

Paul	Dom	Chris
10	8	16

**Saturday, May 24<sup>th</sup>**

Continue design details

Obtain lumber for building studio elements

Prepare shop for construction

Dominic turns in Literature reviews

Hours:

Paul	Dom	Chris
6	5	6

**Sunday, May 25<sup>th</sup>**

Begin constructing new shop components

Dominic turns in tool safety procedure peripherals

-tool description

-tool safety

Hours:

Paul	Dom	Chris
3	5	3



**Monday, May 26<sup>th</sup>**

Dom turns in first draft of Studio Safety Commandments

Items for review due @ 5

-construction drawings

-revised detailed floor layout

-budget update

-Dom's work

Hours:

Paul	Dom	Chris
10	5	10

**Tuesday, May 27<sup>th</sup>**

Meet with Susan and Jess to discuss current progress on portfolio

-discuss studio element plans

Continue design details

Continue construction

Dom turns in procedural research for guidelines

Hours:

Paul	Dom	Chris
8	5	8

**Wednesday, May 28<sup>th</sup>**

Items for review due @ 5

Continue construction

Dom turns in construction guidelines for stock scenery units

Hours:

Paul	Dom	Chris
7	5	7

**Thursday, May 29<sup>th</sup>**

Meet with Susan and Jess to further discuss current progress

-discuss finalizing studio elements

Dom continues literature research

Hours:

Paul	Dom	Chris
6	5	10

**Friday, May 30<sup>th</sup>**

Continue construction

Begin design of finalized studio elements

Hours:

Paul	Dom	Chris
8	5	8

**Saturday, May 31<sup>st</sup>**

Continue construction

Hours:

Paul	Dom	Chris
7	5	7

**Sunday, June 1<sup>st</sup>**

Continue construction

Finish design of finalized studio elements

Begin budgeting and shopping research for studio elements

Hours:

Paul	Dom	Chris
8	5	8

**Monday, June 2<sup>nd</sup>**

Dom returns

Continue construction

Finish budgeting for studio elements

Begin portfolio assembly

Items for review due at 5

-remainder of Dom's writings

-Finalized studio element design and budget

Hours:

Paul	Dom	Chris
7	5	7

**Tuesday, June 3<sup>rd</sup>**

Meet with Susan and Jess to discuss progress

-finalized studio element design

Implement safety procedure peripherals

Begin implementing studio elements

Hours:

Paul	Dom	Chris
7	6	9

**Wednesday, June 4<sup>th</sup>**

Continue construction

Hours:

Paul	Dom	Chris
10	9	9

**Thursday, June 5<sup>th</sup>**

Meet with Susan and Jess to discuss progress

Hours:

Paul	Dom	Chris
9	9	9

**Friday, June 6<sup>th</sup>**

Continue Construction

Hours:

Paul	Dom	Chris
8	9	9

**Saturday, June 7<sup>th</sup>**

Begin to work on small construction projects

Hours:

Paul	Dom	Chris
12	11	12

**Sunday, June 8<sup>th</sup>**

Implement organization

Hours:

Paul	Dom	Chris
12	11	11

**Monday, June 9<sup>th</sup>**

Last meeting with Susan and Jess till the end of the term

Continue working on portfolio pieces

Finish studio video.

Hours:

Paul	Dom	Chris
16	16	17

**Tuesday, June 10<sup>th</sup>**

Final meeting

Portfolio due

Hours:

Paul	Dom	Chris
14	14	14

	Paul	Dom	Chris
Final hours	322	306	296

# Appendix D

## Lab Safety Meeting Minutes

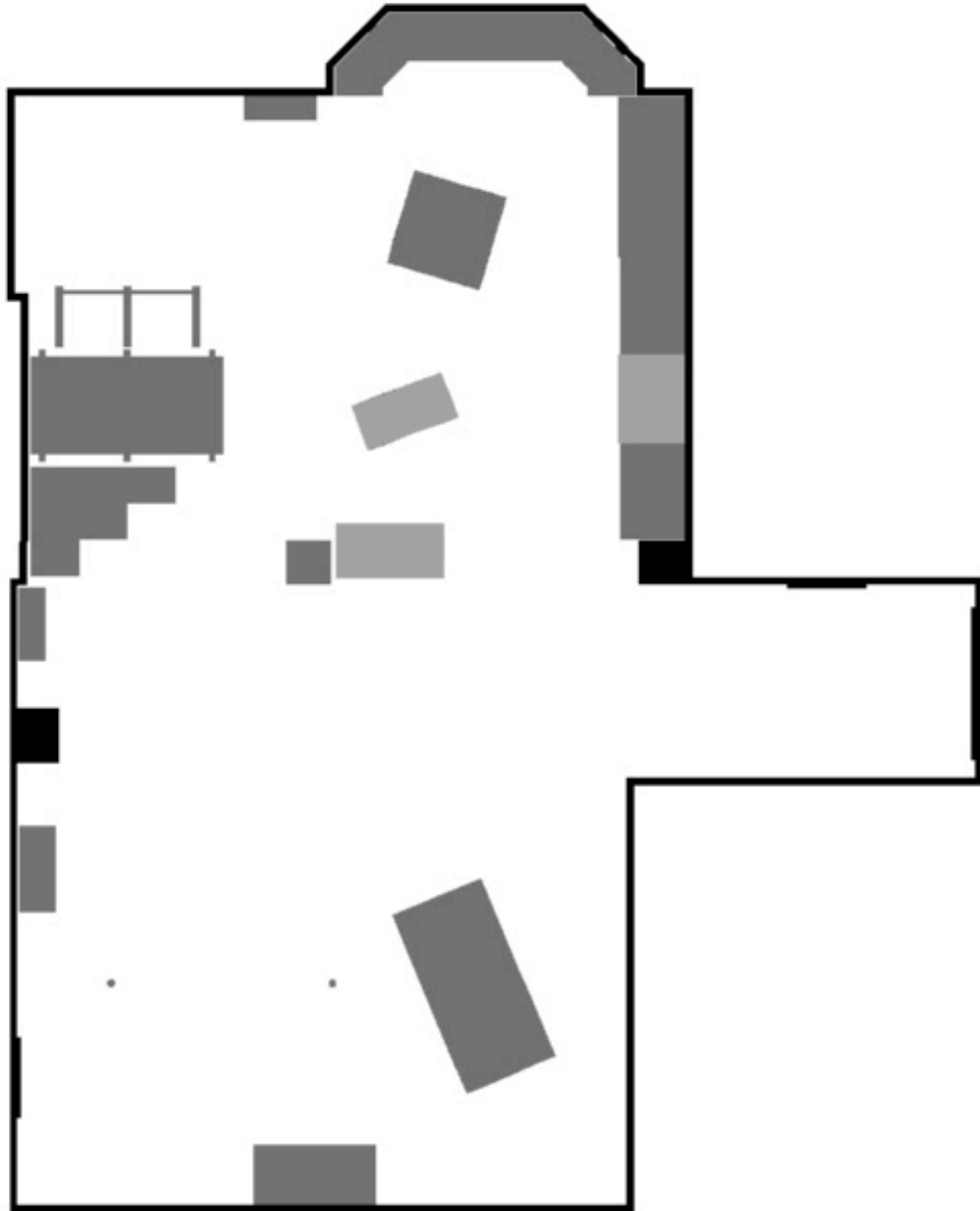
Tuesday May 20, 2008 9:15am

- met with Dave Messier and Chris Salters, introduced ourselves
- overall a very positive meeting
- discussed possible safety concerns
  - sprinklers: adequate currently, should not be blocked
  - EXIT signs: light not working, Chris is organizing the repair through facilities
    - fire exits: it was noted that both doors should be kept clear for emergency exit at all times; this was the highest priority for them.
    - fire extinguishers: adequate currently
    - eye wash station is running properly
    - emergency lighting: adequate
    - current flammable storage locker is good
    - no general hazards found
- discussed environmental issues related to waste removal
  - paint/stains should be disposed of dry, or given to Dave who will handle removal properly if he is notified
  - halogen lights, batteries, etc, should be removed by methods described on environmental official websites
- finally we discussed how the studio will be used
  - each individual tool has instructions which must be followed carefully, especially with respect to things such as blade guards and stops
  - proper eye protection (goggles will be worn at all times during construction)
  - ear and hand protection

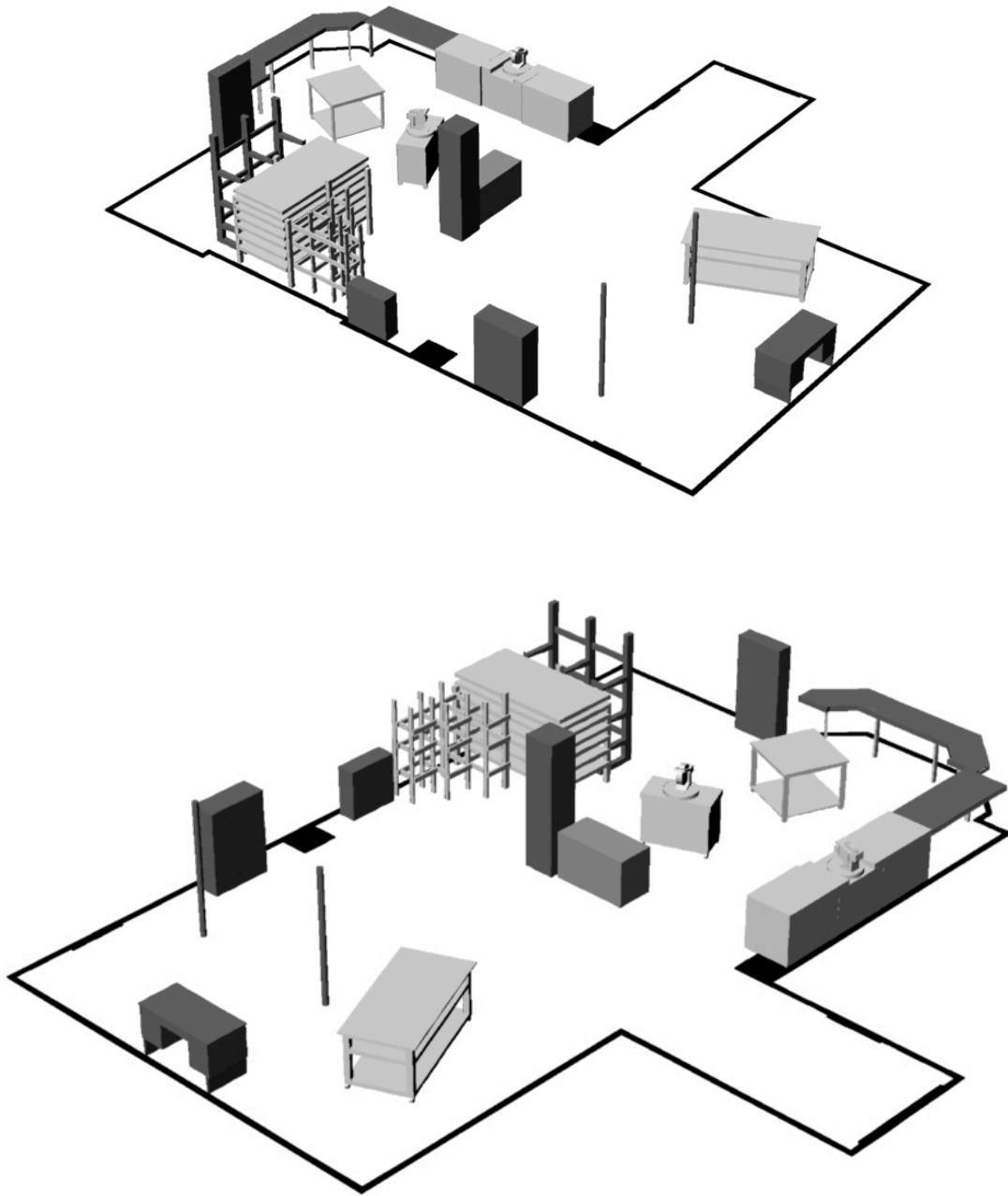
-the studio currently is safe, has the proper emergency equipment, and everything discussed has already been planned into the rest of the studio renovation



**Appendix E**  
**Construction Drawings**  
**Floor Layout**

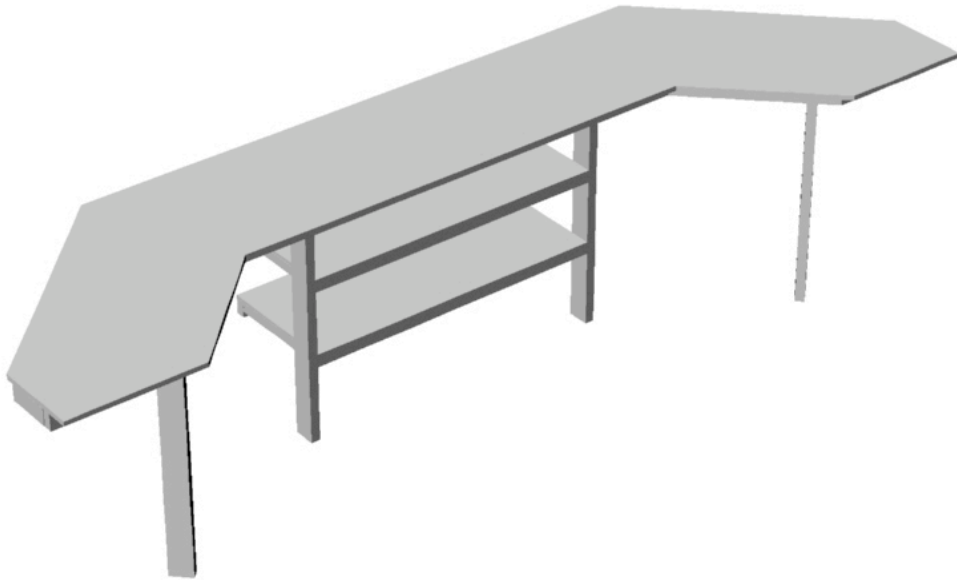
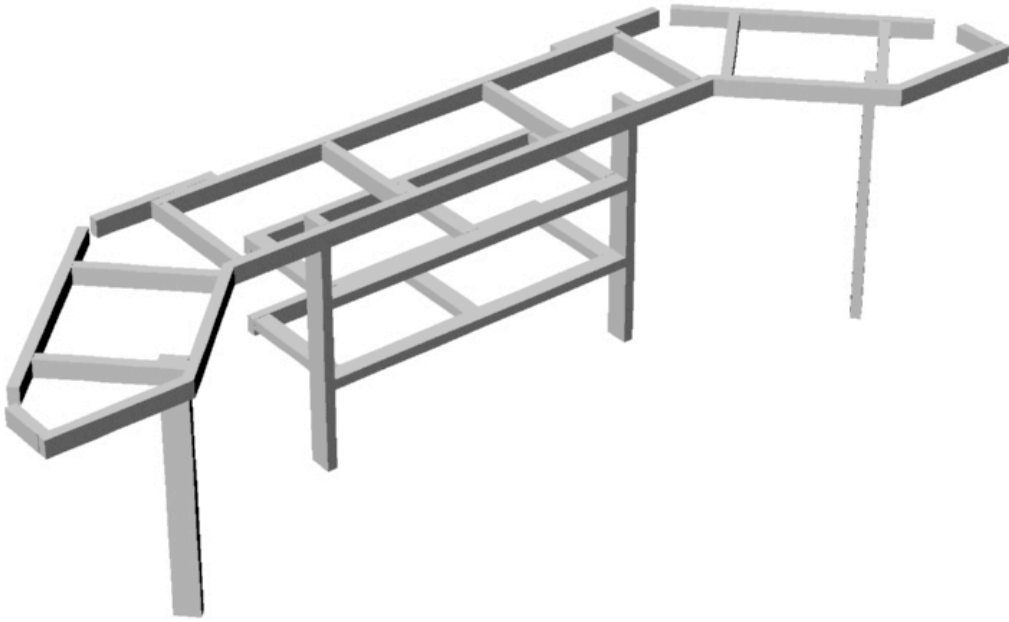


Top view of the studio's layout

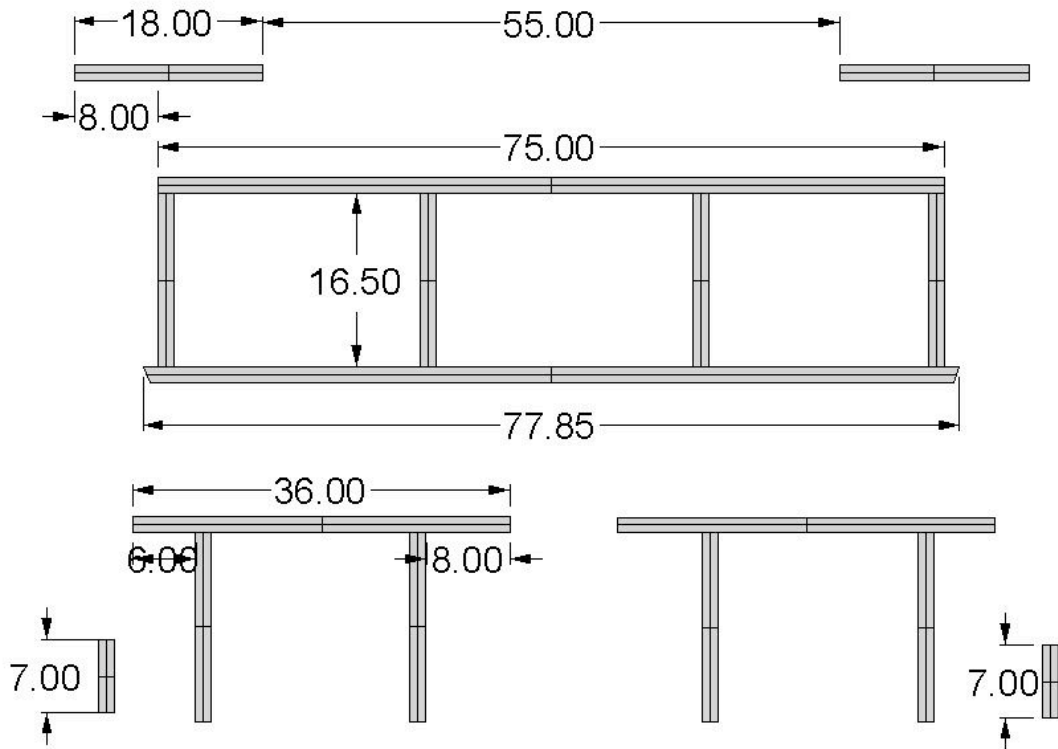


Perspective renders of the studio's layout

## Counter Tops



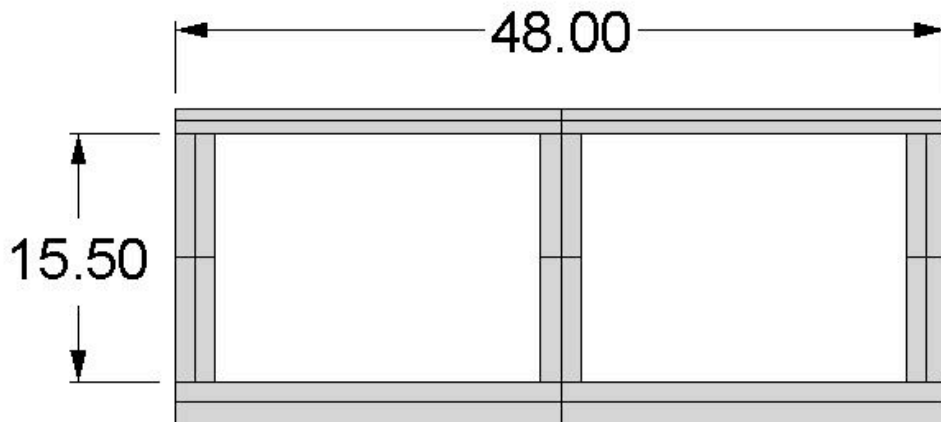
Perspective render of the corner nook counter



Top and side views of the corner nook counter

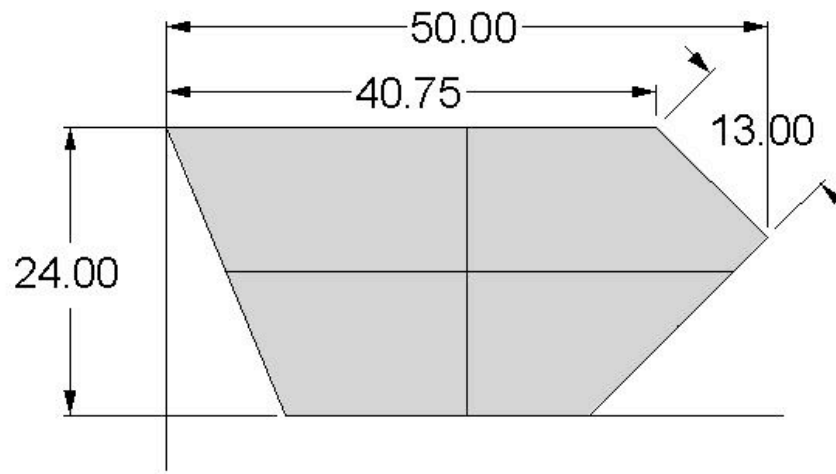
2x3's (2x)

-note some 2x3's laying on their side



Top view of the corner nook shelf

3/4 MDF (2x)

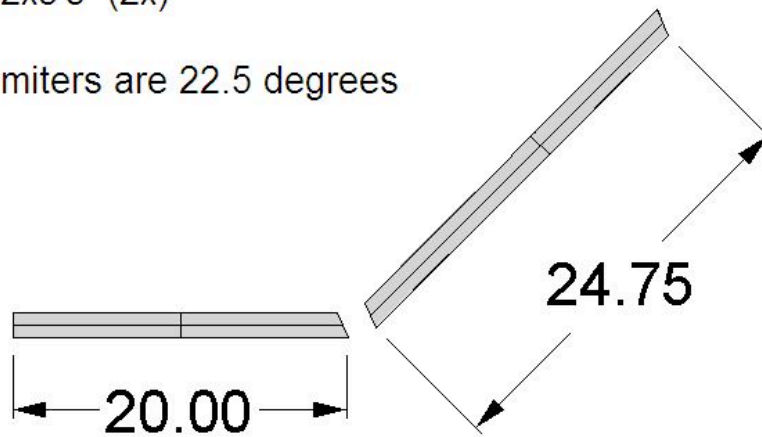


22.50°

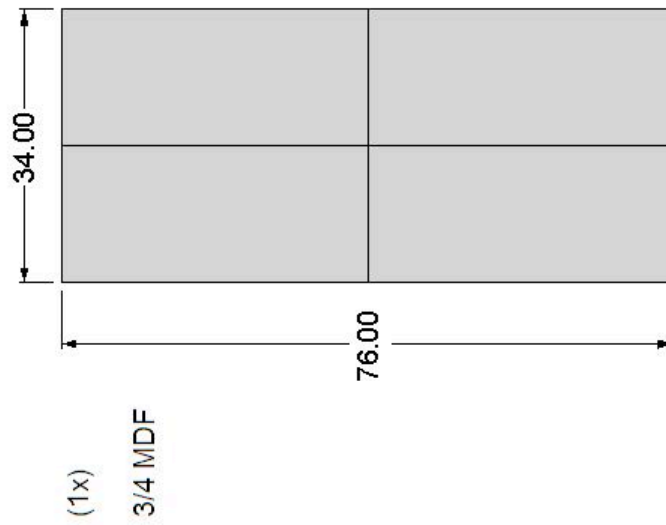
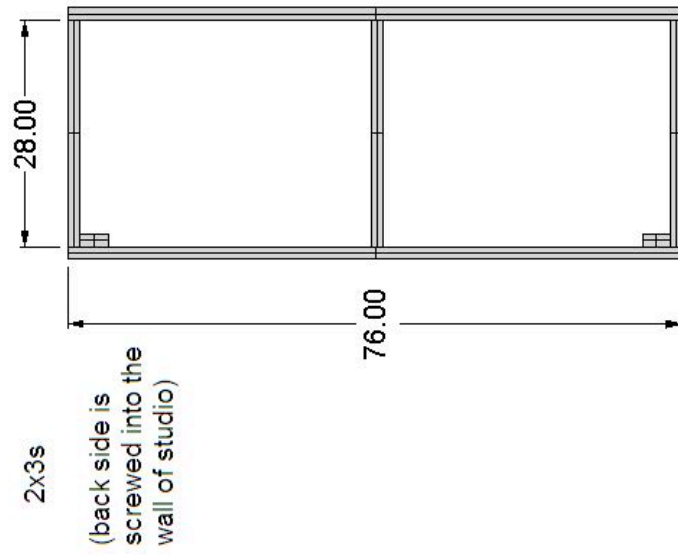
Corner nook side counter top designs

2x3's (2x)

miters are 22.5 degrees

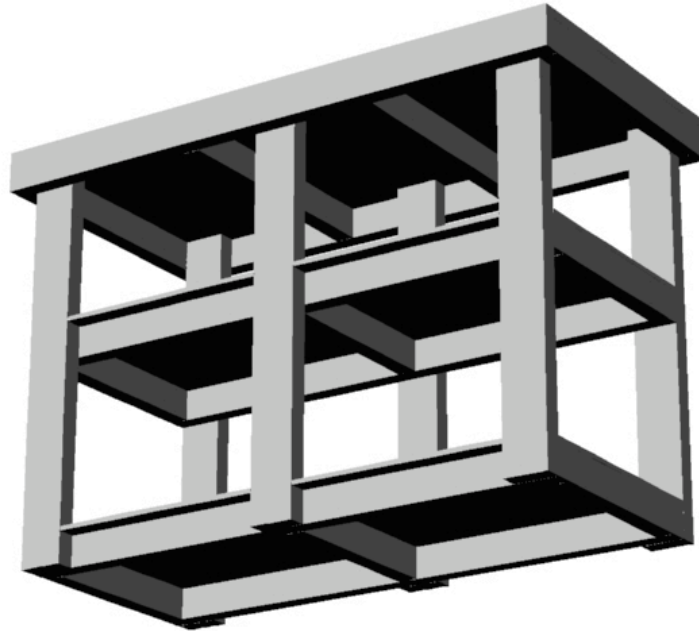


Corner nook side bracing

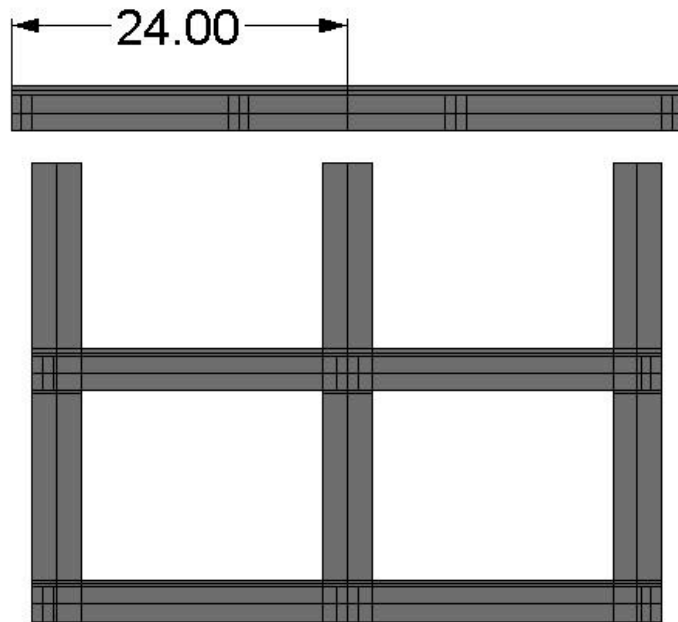


Counter top and framing for the long counter.

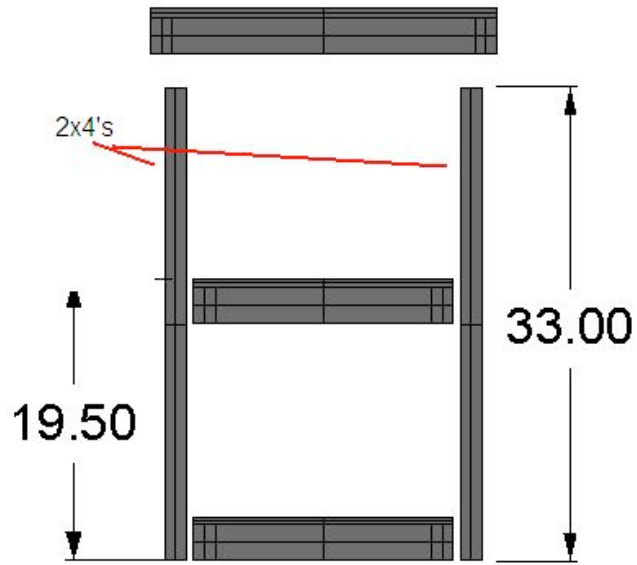
# Chopsaw Cart



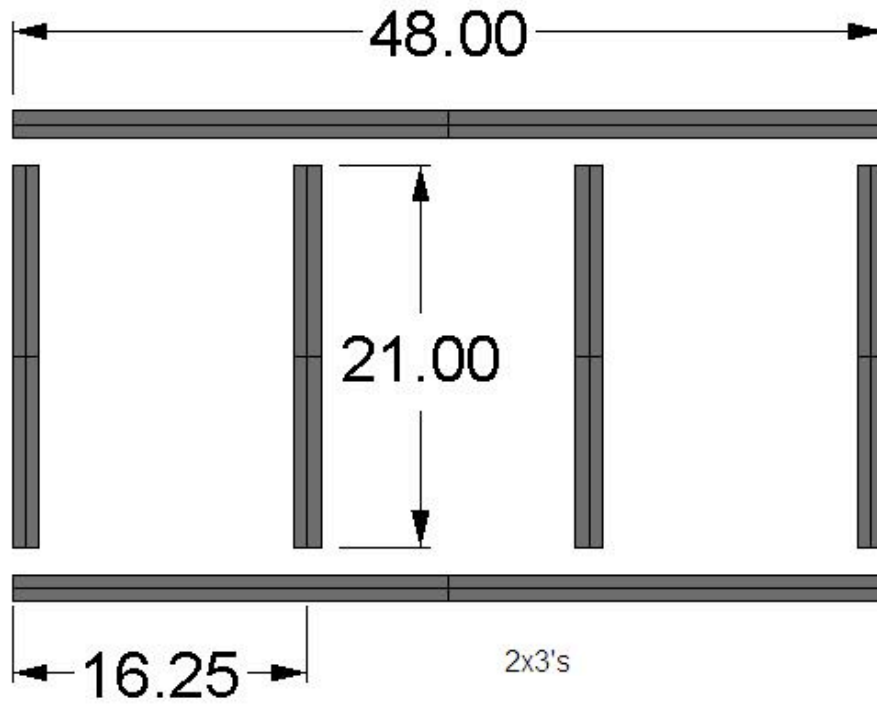
Perspective rendering of the chopsaw cart



Front view of the chopsaw cart.

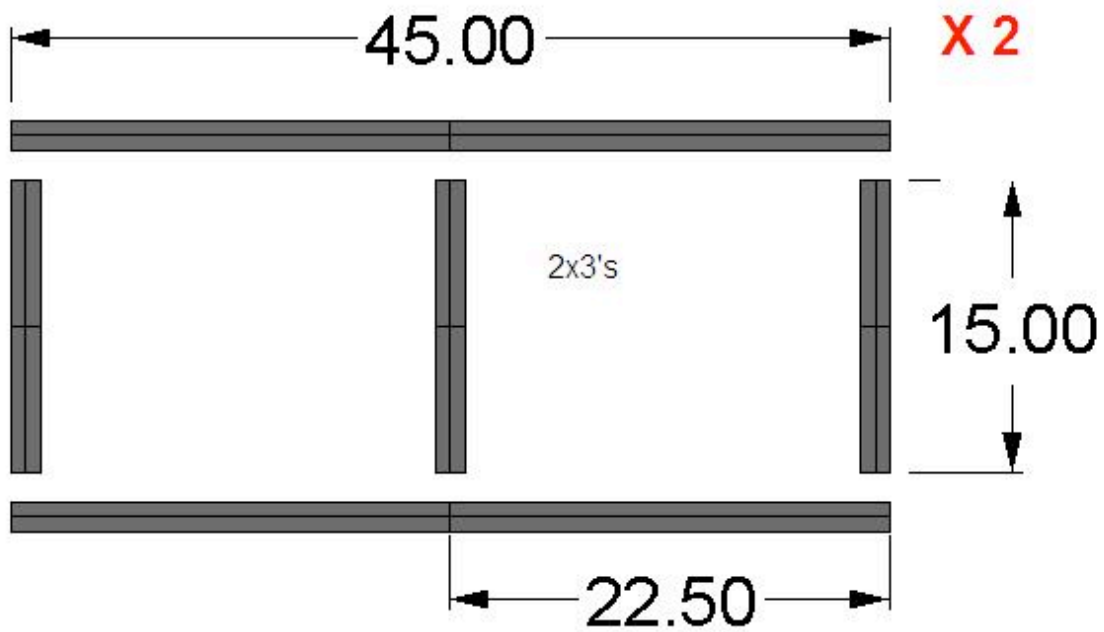


Side view of the chopsaw cart

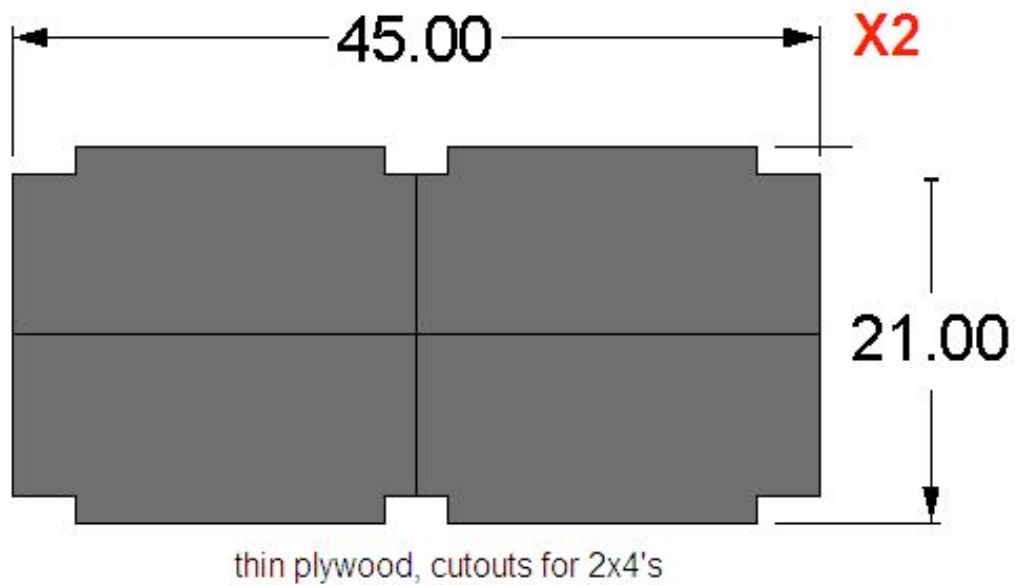


The design of the top counter of the chopsaw cart





Inner shelf design for the chopsaw cart.



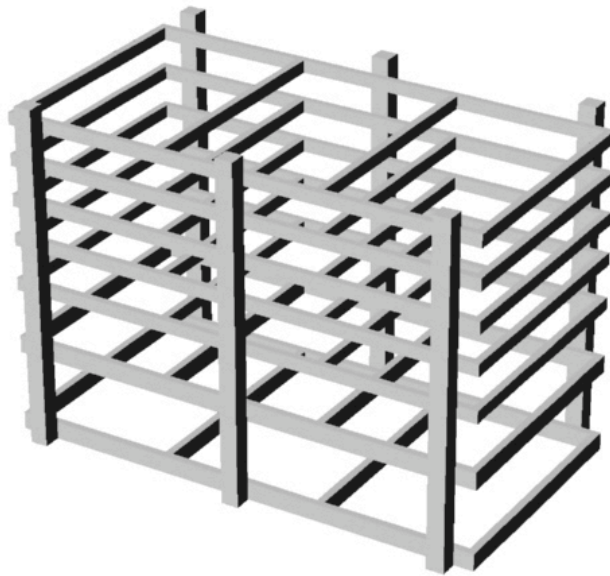
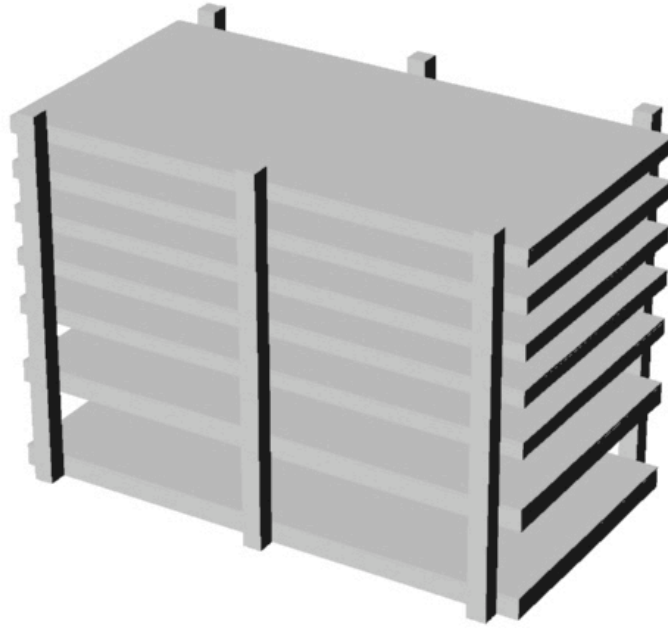
Counter top design for chopsaw cart inner shelf



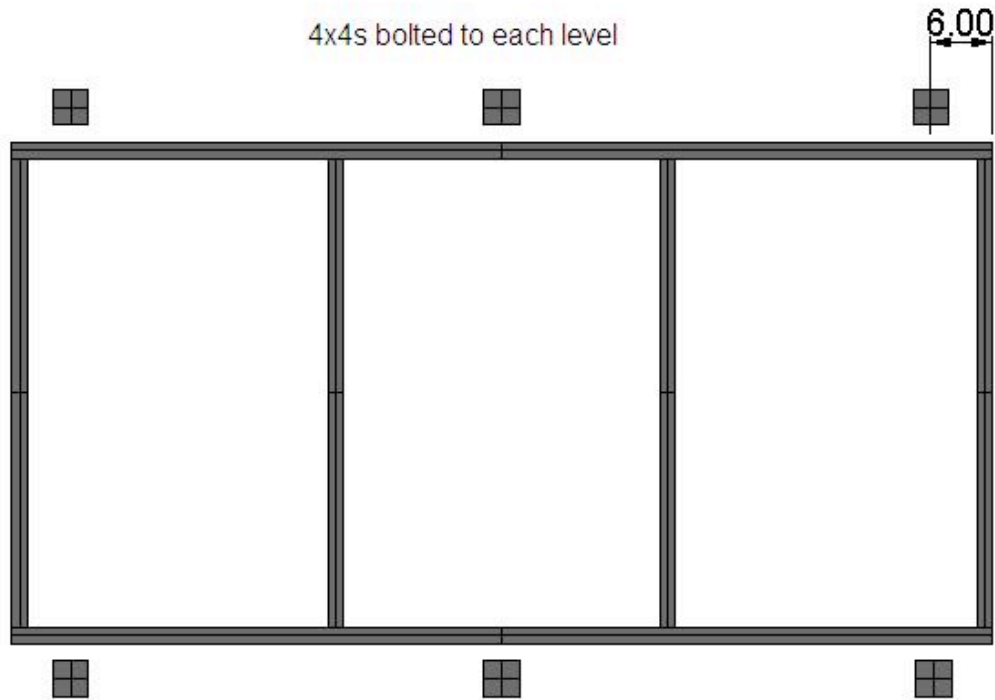
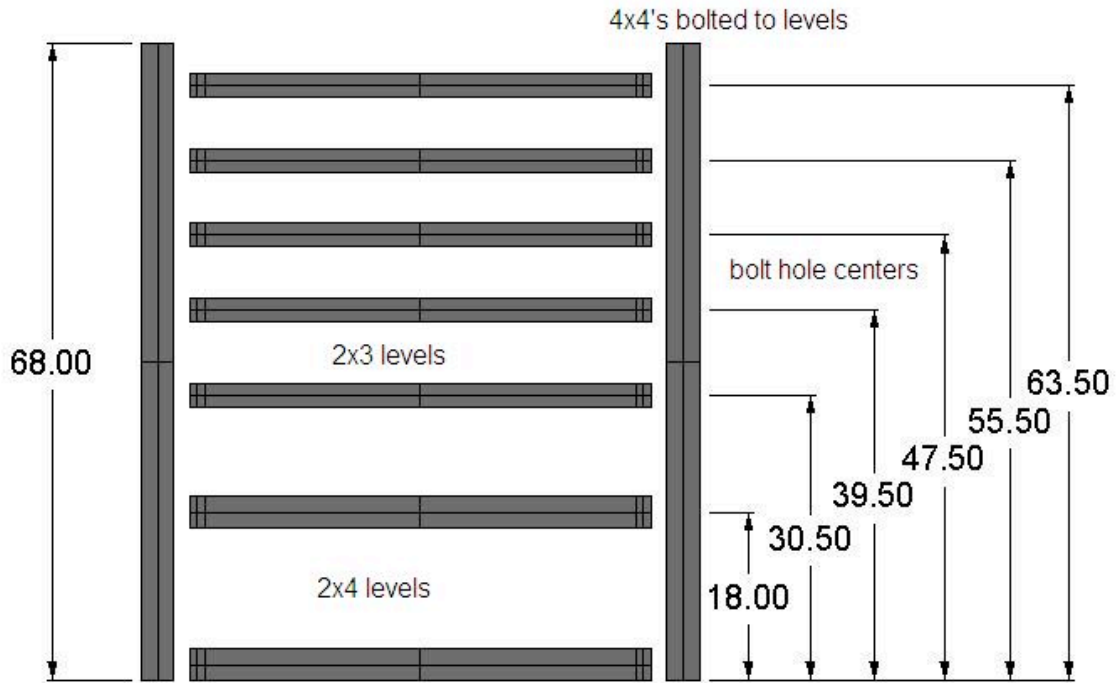
plywood or MDF

Countertop design for top of chopsaw cart.

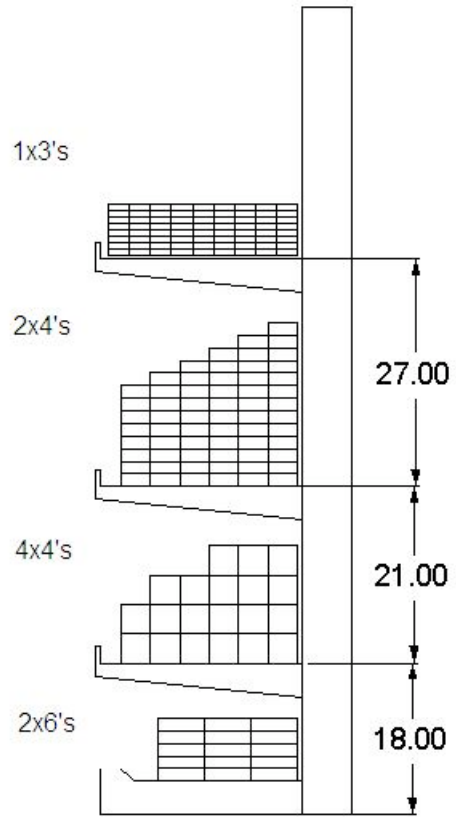
## Wood Storage



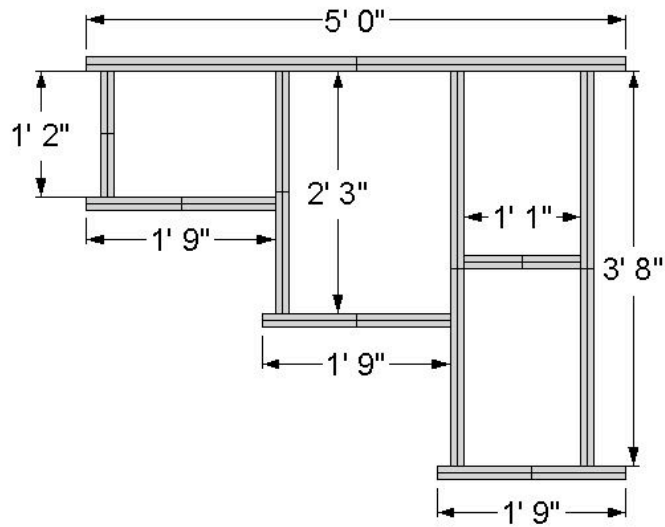
Perspective renderings of flat goods storage



Side and top views of the flatwood storage area.



New wood storage rack



Cut wood storage rack top view

# **Appendix F**

## **Safety Peripherals**

# Safety Placards Posted Near Their Tools

# IMPORTANT! READ FIRST!

## PAINTING SAFETY

### *Latex Paint*

- **Always Paint With Ventilation.** Latex paint emits fewer fumes than oil based paint, but it still does release some fumes. Painting in an area with good ventilation will improve drying time as well.
- **Clean Brushes with Soap and Water.** Latex paint is water based, so all it needs is water to wash out. Rinse brushes, rollers, and sponges with cold or room temperature water. Don't use paint thinners. It will only shorten the life of the paint brush. Murphy's oil soap diluted in water can be used along with hot water. If you are going to reuse a brush, don't leave it out. Use it again soon, or wash it.
- **Buy Only What You Need.** Common latex paint from a hardware store does not store well once opened. Buy less of it, and if you do need to store it, store it with the lid on tight in a cool place.
- **When Paint Does Go Bad:** Latex paint is only toxic in its liquid form. The dried product, which is mostly latex, can be thrown out regularly. When you have very little paint left, take the cap off to let the rest dry in the can. When there is a lot of paint left, or if unopened paint spoils, pour the paint into saw dust, or cat litter, which will dry it out quickly, and can then be thrown out. The Studio's "paint graveyard" is located in a large, antique looking footlocker.
- **Read The Label.** Remember, the safest thing to do when using any product is to read the directions and follow the manufacturer's safety instructions.

### *Oil Based Paint, Thinners, and Solvents*

- **Always Paint With A Lot Of Ventilation.** Solvents and oil based paints release an abundance of fumes. Painting should be done in very well ventilated area. Fans in windows, fume hoods, or high capacity building ventilation should be used. A respirator can help for prolonged exposure. Breaks for fresh air should be taken every few hours.
- **Clean Brushes With Designated Solvents.** Oil based paint, and other nasty chemicals you might be painting on to things don't like to come out of brushes. The best bet is to use disposable brushes, and then throw them away. So a sub rule could be "don't use heavy solvents with good brushes".
- **Store In A Flammables Locker.** These products can catch fire, and also, are at risk of releasing fumes unless very well sealed. A Flammables locker should be kept, and only flammable material should be stored in it.

- **Dispose Through The Proper Channels.** Oils and Solvents are toxic, and cannot be disposed of like normal paint. Fortunately, our campus has a disposal service. First, gather up what needs to be disposed, and put it all in one area, easily collected. A cardboard box is a good start. Then, fill out the form found on this website: <http://www.wpi.edu/Admin/Safety/waste.html>

## *Spray Paints*

- Spray paints follow all of the same rules as oil based paints and solvents. However, the paint atomizes itself and hangs in the air for a very long time. As such **Never Spray Paint Indoors.** In special situations where spray painting indoors is acceptable, set up a painting booth with a hood to contain the spray, and always wear a respirator.



# IMPORTANT! READ FIRST!

## TABLE SAW SAFETY

- **Always use a table saw with 2 people.** A shop should always have 2 people in it for safety, but a table saw really does require 2 people to be truly safe. One person should feed the board into the blade, and the other should catch the board. Catching does not mean pulling.
- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when using a chop saw. Loose clothing, jewelry, full fingered gloves, and long hair can give the saw something to grab, pulling you into the blade, so leave them at home.
- **No freehand cutting.** A board should always be guided through the saw with the fence or a miter gauge.
- **Keep your hands away from the blade.** If you cannot push a work piece through (on both sides) with 4" of clearance from your hand to the blade, use a push stick.
- **Use all saw safety equipment.** The saw guard, board splitter, and anti-kickback pawls should be left on the table saw unless a cut absolutely cannot be made without them. Additional shop tools, like fingerboards, should be used with cuts whenever possible.
- **Never reach over the saw blade.** There is no reason to ever need to do it, and it's dangerous, so don't.
- **Always Finish Your Cut.** Don't stop the saw before making sure that the cut is complete.
- **Service table saw regularly.** Cleaning the blade of a saw can mean a world of difference for a table saw. Also, having the right kind of saw for the jobs you do the most helps. The general rule is that rip saws have less teeth with bigger gaps. In general, buying carbide blades will always give better results than steel, and can be resharpened. Also, aligning your blade and your fence can prevent wood burning and kickback. Instructions for aligning a table saw blade can be easily found online.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When making cuts, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the saw operator, feel safe before you proceed.

# IMPORTANT! READ FIRST!

## CHOP SAW SAFETY

- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when using a chop saw. Loose clothing, jewelry, full fingered gloves, and long hair can give the saw something to grab, pulling you into the blade, so leave them at home.
- **No freehand cutting.** A board should always be secure and snug against the back fence.
- **Keep your hands away from the blade.** If you cannot hold down a piece with the designated clearance printed on the saw from your hand to the blade, find another way to secure the piece or use another tool to cut it.
- **Do not start saw on piece.** Start the saw and allow it to completely spin up before contacting wood. Starting on, or restarting in the middle of a cut can throw the wood.
- **Use all saw safety equipment.** The guard and fence should always be in working order. If either seems broken, fix it immediately.
- **Never re-cut small pieces.** There is little to no way to safely cut a small enough piece of wood, so just cut a new one.
- **Always Finish Your Cut.** Don't stop the saw before making sure that the cut is complete.
- **Never reach over the saw blade.** Do not reach through the cutting area or cross your arms while cutting.
- **Service chop saw regularly.** Cleaning the blade of a saw can mean a world of difference. Also, buying carbide blades will always give better results than steel, and can be resharpened.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When making cuts, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the saw operator, feel safe before you proceed.

# IMPORTANT! READ FIRST!

## CIRCULAR SAW SAFETY

- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when using a circular saw. Loose clothing, jewelry, full fingered gloves, and long hair can give the saw something to grab, pulling you into the blade, so leave them at home.
- **Attempt guided cutting.** Circular saws only cut strait. Attempting to turn them during a cut can cause kick back, and serious injury. Always cut as strait as possible, following a line, or when you can, a shop built circular saw guide.
- **Keep your hands away from the blade.** If you cannot hold down a piece with 4” of clearance from your hand to the blade, find another way to secure the piece.
- **Do not start saw on piece.** Start the saw and allow it to completely spin up before contacting wood. Starting on, or restarting in the middle of a cut can throw the wood.
- **Never reach over the saw blade.** Do not reach through the cutting area or cross your arms while cutting.
- **Always Finish Your Cut.** Don't stop the saw before making sure that the cut is complete.
- **Service circular saw regularly.** Cleaning the blade of a saw can mean a world of difference. Also, buying carbide blades will always give better results than steel, and can be resharpened.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When making cuts, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the saw operator, feel safe before you proceed.

# IMPORTANT! READ FIRST!

## JIG SAW SAFETY

- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when using a jig saw. Loose clothing, jewelry, full fingered gloves, and long hair can give the saw something to grab, pulling you into the blade, so leave them at home.
- **Keep your hands away from the blade.** If you cannot hold down a piece with 4” of clearance from your hand to the blade, find another way to secure the piece.
- **Do not start saw on piece.** Start the saw and allow it to reach full speed before contacting wood. Starting on the piece throw the wood.
- **Never reach over the saw blade.** Do not reach through the cutting area or cross your arms while cutting.
- **Always Finish Your Cut.** Don't stop the saw before making sure that the cut is complete. When finishing a jigsaw cut, don't lift the blade up and out while running, because the blade may bounce on the surface of the piece and get damaged. However, with a jigsaw, you may back up, and turn, unlike other saws.
- **Service jig saw regularly.** Cleaning the blade of a saw can mean a world of difference. Remember, jig saw blades are mostly disposable. They break, bend, and get dull. If your cutting will be better with a fresh blade, get one.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When making cuts, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the saw operator, feel safe before you proceed.

# IMPORTANT! READ FIRST!

## PNEUMATIC TOOL SAFETY

- **Wear appropriate gear and clothing.** Eye protection should always be worn when using pneumatic tools.
- **Be aware of sight lines.** Nail and staple guns can ricochet and hit others, especially when firing at an angle. They can also sometimes double fire, which can increase the chance of a fastener bouncing away from the work area. Be aware of people working down range, and how your handling your fastening gun.
- **Keep hands clear of nozzle at all times.** While driving a screw through your hand sounds unlikely, a staple gun can easily, and quickly, fire a fastener through gloves and hands alike. Do not disable, or manually engage the dead mans trigger.
- **Make sure nozzle is pointed down when attaching to compressor.** If the pressure in a compressor is too high, it can misfire the tool, especially fastening guns.
- **Service compressor and tools regularly.** Compressing air pulls water vapor into the tank. It can corrode the compressor, leaving it unsafe. When finished using a compressor, you should drain it from the bottom, tilting it so that all moisture can run out. Additionally, most air tools need to be oiled from time to time.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing.

# IMPORTANT! READ FIRST!

## DRILL/DRIVER SAFETY

- **Wear appropriate gear and clothing.** Eye protection should be worn when using a screw gun.
- **Keep hands free of the work area.** A screw gun can skip off of a screw, and injure your hand.
- **Lock when not in use.** To extend the life of the battery, and for storage, lock the screw gun out of gear.
- **Predrill holes when possible.** Pre-drilling holes for screws, especially in situations where longer screws are appropriate, will give a tighter fit, and make your drills work easier, extending the life of the motor.
- **Do not strip screw heads.** When the drill begins to skip, it will eat away the screw head, as well as the bit, making it impossible to use either. This will also increase the chance of the drill slipping out and hitting your hand. When skipping, find another position with more leverage, or remove the screw and pre-drill your hole.
- **Attempt level driving.** You, or someone else should make sure that your drill is level with the wood, or you increase your chance of skipping, bending your screw, or having the screw tip poke out of the side of your piece.
- **Run down batteries before charging.** Drill gun batteries are very susceptible to battery memory, so if you recharge a half full battery, half full becomes the new zero, and it will only ever last half as long. As such, always run down your batteries as far as you can before charging.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing.

# IMPORTANT! READ FIRST!

## ANGLE GRINDER SAFETY

- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when using an angle grinder. Loose clothing, jewelry, full fingered gloves, and long hair can give the grinder something to grab, pulling you into the wheel, and wrecking the grinder, so leave them at home.
- **Leave guard on the grinder at all times.** Grinding metal shoots sparks tangentially from the piece in the direction of the grinders spin. Know this, and adjust the guard accordingly, protecting yourself and others.
- **Keep your hands away from the blade.** If you cannot hold down a piece with 4" of clearance from your hand to the blade, find another way to secure the piece.
- **Do not start wheel on piece.** Start the grinder and allow it to completely spin up before contacting work. Starting on the piece can kick the grinder out of your hands.
- **Service grinder regularly.** Grinder blades are abrasives, and wear themselves down in the course of their service. When a wheel looks too ratty, or becomes too small to use safely without damaging the grinder, replace it.
- **Use two hands.** A grinder is a powerful tool. It can jump away from the unwary.
- **Be aware of down field shrapnel.** When cutting off protruding metal, or even during common grinding, sparks and metal bits can be thrown quite far. Make sure no one is standing in the path of your debris, and be safe about your placement.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When grinding, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the tool operator, feel safe before you proceed.

# IMPORTANT! READ FIRST!

## ROUTER SAFETY

- **Wear appropriate gear and clothing.** Ear and eye protection should be worn when routing. Loose clothing, jewelry, full fingered gloves, and long hair can give the router something to grab, pulling you into the bit, and wrecking the router, so leave them at home.
- **Make sure router is secure.** Routers are not designed to be free hand tools. Make sure that the router base is secure against the work surface. If you are using a plunging bit, and want a strait cut, use a guide. If you are routing an edge, make sure that the roller will have a smooth surface and be supported along the full edge.
- **Beware of screws.** Routers are not designed to cut metal. Their speed will let them cut screws, but not safely for the tool or the user.
- **Rout from left to right.** Routers will climb with the direction of their rotation. As such, only route and edge from left to right.
- **Keep your hands away from the bit.** Router bits spin very fast, and are extremely sharp. Do not put your hands near the bit when its spinning, always make sure a router is off before attempting to change bits. Never reach under a surface that you are routing through.
- **Do not start bit on piece.** Start the router and allow it to completely spin up before contacting wood. Starting on the piece will jump the router, damaging the bit and the work surface, and possibly injuring the user.
- **Always Finish Your Cut.** Don't stop the router before making sure that the cut is complete.
- **Use two hands.** A router is a powerful tool. It can jump away from the unwary.
- **Service router regularly.** Router bits are precision cutting tools. They can get chipped and dull, making ugly and unsafe cuts. Check your bits regularly and replace them when needed. Also, make sure that the routers height adjustment and shaft lock systems work properly.
- **If it feels unsafe, it probably is.** Make sure to use your eyes and ears, and think about what you're doing. When routing, try to have your feet squarely planted. Make sure everyone and thing is clear of your work area, and make sure that you, the tool operator, feel safe before you proceed.



## **3 Simple Rules Posted As You Enter**

### **Remember! When Tools Are In Use...**

1. Never Work Alone.
2. Wear Safety Glasses.
3. Close Toed Shoes Required.

# **Appendix G**

## **Scenic Design Studio Agreement**

We would like to recommend the instituting of a Scenic Design Studio Agreement. This is a fairly informal contract between the WPI Drama/Theatre division of the Department of Humanities and Arts, and Masque and any Master Carpenter who wishes to use our space.

# Scenic Design Studio Agreement

Here at WPI we are blessed to have a dedicated space for the design and construction of Scenery. A lot of time and effort has gone into cleaning the space and making it what it is today. However haste and carelessness could easily result in the studio becoming irreparably dirty or worse people being seriously injured, for these reasons it's critical that you read and agree to honor each one of these rules before you work in the Scenic Design Studio.

1. You must always work in the studio with another person.
2. When tools are being used everyone in the studio must wear suitable eye protection.
3. When loud power tools are being operated everyone must wear suitable ear protection.
4. Absolutely no horseplay in the studio.
5. Before anyone operates a tool they must know how to safely operate it.
6. Respect and make use of the storage systems that are in place.
7. Measure twice cut once, you'll save time and lumber.
8. At the end of the day sweep and vacuum the studio.
9. At the end of a show do an extensive cleaning. The studio should look better than you found it.
10. Follow and enforce all the posted studio rules, they are not suggestions.
11. If a problem does arise contact your show's liaison immediately.

I have read and agree to all these rules:

---

# Appendix H

## Photos



The entrance to the new Studio.



As we worked we created quite a mess.



Me used a makeshift cart for moving platforms and lumber.





During Goddard's Renovation we were able to snag some free stuff.



Paul at work in the studio.





We built this new chapsaw cart for moving tools and working in the Little Theatre.



The fire extinguisher inspection guy made sure we were up to code.





Dom works hard as the flat wood storage starts to come together.



Chris and Rick assemble the wall-o-white boards.





The Design Table starts to take shape.



Paul cuts wood with the new chopsaw.



Dom mounts wood directly into the brick using masonry screws.





Chris removes a 2x3 from the wall.



Paul assembles a frame using the new impact driver.



Dom demonstrates the new paint graveyard.



The old empty paint cans, which we filled the paint graveyard with.





This metal cabinet used to hold all our tools, now they're stored under work benches.



As we worked we accumulated quite a mess.



The new platform and flat storage system.





The completed flat wood storage, and cut lumber storage areas.



Paul works at the Design Table.



Paul works on the new Little Theatre model.



The finished Design Corner.





The Design Corner complete with severed arm.



The fire escape is now accessible.



With all the stuff gone the Studio seems much bigger now.



The paint sink and painting tools now cleaned up.





Our main work area finished up.



Our tools now hang against the walls.



Our tools are also stored beneath work spaces.







The new chopsaw we purchased to replace the radial arm saw.



Goggles and headphones are now stored near the entrance.