

The Madrigal Dinners; a Modular Study



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Honors Thesis

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PART ONE

Environmental design is a diverse art form in which media art, expositions, museums, home interiors, theatre, department stores or tradeshow all call for an innovative and complex solution. An environmental design requires skill, knowledge of spatial function, technical expertise and marketing to create an ideal atmosphere for each specific space. Every space is a venue for a type of design and each design serves a purpose and tells a story. Tradeshow design and Theatre design are two temporary venues that most commonly use what is called Modular design, design in which structures can be easily moved around and reused. Each method uses different types of modularity to serve its purpose and unfortunately tradeshow and theatre engineering techniques have little in common anymore. Modular design has recently become more popular for its “green qualities” and both theatre and tradeshow designs are using these new means improve the reusability of their sets.

What Is Modularity?

Modular design can be explained in numerous ways. The basic definition is “an approach aiming to subdivide into smaller parts or modules that can be independently created and then used in different systems to drive multiple functionalities”(dictionary.reference.com). It is seen most commonly in architecture, using the same designs in a rural setting to save on cost and labor, and it is also used in the designs of cars, computers, and other mechanical construction. Even children’s toys such as Lego’s and K*nex utilize modules to build radically different configurations. Modular design and engineering always ends up centering on the cost and efficiency of a project. Using a piece that snaps or clasps on and off another piece to create a wall or door saves manufacturers time and money, especially in a fast moving market as the Tradeshow industry. Clients are not only paying for the design of the set or exhibit, but the shipping cost, the labor cost, the space rental, and the list goes on. Therefore, the more money that is saved in assembling and shipping the set, the more likely the client will return for your business. The only truly unfortunate side of modular design is lack of optimal performance due to restrictions of components used. Building an original custom design has its own challenges, however, the design can be easily based around the purpose of the company, product or story. With modular design, restrictions such as weight, budget, and time constraints limit the options for the best possible solution.

History and Progress of Exhibit Design

Modular environmental and structural design has a rich history. For a long time, exhibiting was based around livestock, cloth and food in markets or outside churches. It wasn't until the mid nineteenth century that modern designers started making conscious decisions in textile, furniture, and architectural design to enhance social and economic betterment. One of the first times designers came in contact with a large-scale modular solution was the Great Exhibition of 1851. This exhibition was built in London to show off new innovation in art and industry from around the world. This was also the first time in history that decorative and industrial arts had so much focused attention. The building, dubbed "The Crystal Palace", was built by Joseph Paxton to be temporary venue. Paxton was originally a gardener turned architect and his solution to the structure moved from traditional stone to cast and wrought iron and large panes of glass. Although Paxton used materials seen in railway stations and green houses, this was the first major structure designed to be configured and built to be assembled and disassembled. Due to the iron and glass solutions in materials and engineering, Paxton was able to build the 746, 592 square foot structure in just ten days. Parts of the building still exist in the United States as part of an architectural museum. The exhibited material in the Crystal Palace proved disappointing, however, as all the designs were still hand crafted and affordable only to those in the upper class. From this many designers took it upon themselves to create designs affordable to the lower class to improve taste and knowledge of good design. The Great Exhibition was the foundation of indoor tradeshow and exhibits and has been a major blueprint in the millions of exhibits to follow. In 1972 the Museum of Modern Design, MoMA, in New York commissioned a series of "Counter-Designs" in which the designers were asked to create a "new mode of living"(Raizman 348) through design. Ettore Scottsass provided a complete modular living design in which each part of the house was set inside a rectangular tube, so one could completely reorganize if necessary. This type of innovation proved that modularity isn't resigned to dull or boring, but can be creative and intriguing.

As the twentieth century moved forward new restrictions to exhibits and theatre sets were set in place for safety. Rules, such as strict fire codes, wiring, sprinklers, double decks, types of fabric and wood put new challenges in place for designers. No longer could a designer truly customize designs specific to the function of

the event. However, along with new restrictions came inventions that dramatically enhanced modular design. In 1948 George de Mestral invented Velcro, a classic hook-and-loop idea he stole from natural burrs he found attached to his dog. Velcro quickly became a widespread success in the tradeshow and theatre industry. No longer was the industry required to use traditional nails or screws. Velcro provided a quick and temporary solution to placing graphics in a booth or on fabric as it saved labor costs and is easily hidden. In 1975, Ted Zeigler invented the first exhibit pop-up display; a series of tubes that functioned similarly to that of an umbrella. The connected tubes could start out condensed, but once pulled apart and snapped into place, a whole new structure would be born. Before Zeigler's invention, the choices in a modular exhibit were crude and cheap. With Zeigler's pop-up display, modular exhibits were suddenly a cheap option while still being effective and professional looking. With the help of R. Buckminster Fuller, Zeigler began to offer more than just a wall panel and created pop-ups in dome shapes as well. Due to the efficiency, effectiveness and affordability of the new system, small custom exhibits disappeared. The arrival of tension fabric in 1983 allowed larger exhibits to expand into a myriad of possibilities, more than that of the traditional square, boxy and hard structures. Bill Moss, owner of Moss Tent Works Inc. saw the possibilities of using tent-like ideas for exhibitions on a large scale. Tension fabric worked similarly to the engineering of a tent. First a series of tubes are set up and assembled and then the fabric is stretched and fastened around the tubes creating an organic or enclosed space. Moss was asked to design a tradeshow for the Belfast company for a sports and recreation exhibit using unconventional materials to stand out against the typical house-like exhibits. Moss was inspired by Frank Gehry, an architect who constructed buildings made to look like bolts of cloth and took a "gigantic tent pattern and made an all-fabric exhibit from it that was more interesting than the tents themselves"(Exhibitor 2007, 30) Faced with numerous rejections, Moss finally brought the designs to a CAD designer who was able to show what the structure would look like and how it could be built. The solutions were simple, the execution easy and creative possibilities endless. They also weighed less, which meant lower shipping costs. Today, roughly 60 percent of the tradeshow industry uses tension fabric for their exhibits.

Modular Theatre Set Design

The theatre industry faced different challenges and changes. In tradeshow design, structures are made to display the company or product and tell its story; in theatre design, the story is provided and the set needs to be designed to properly convey that story. Most theatre sets designs ride slightly on the line between custom and modular sets. For each show the set needs to function primarily to explain the specific play, but is also required to be moveable and function as a convincing environment to the specific scene. Set design has always required versatility and modularity in its design since different scenes need to embody different atmospheres and feelings. Set items have “always needed to be reasonably lightweight, including the potential to be broken down and rebuilt while avoiding damage to the design”(Blurton 58). The variety of modular sets for theatre varies depending on the budget and type of show. For simple one-act plays, staging designers usually are forced to choose only the objects necessary to the one-act’s necessities such as a table and chairs or a single door. Traveling shows such as Broadway, however, design their sets to look custom but act modularly and usually require the use of many huge semi-trucks to ship the set. A traveling show such as Broadway must design and configure a set to fit inside of a semi and it must be loaded and unloaded the same every single time the show moves to a new city. The show *Cats*, a musical composed by Andrew Lloyd Webber was the first show to use an entirely modular set. In 1982, the unconventional show premiered on Broadway and the set was an innovation in itself. Designed by John Napier, the set was “totally transformed the elegant theatre into a suitable cat habitat” (Sommer). The scenery was an assemblage of oversized garbage dump artifacts. The set was considered modular because of the set pieces could be moved at a moments notice if needed. The set also breeched audience barriers, for instance, building on-stage seating and creating ramps through the isles for the actors to crawl through onto stage. Smaller community or educational theatres are faced with a need to build a functional stage for full-length productions under extremely limited budgets and resources. The best ways to overcome these challenges are to try to maintain as much modularity as possible. Sets commonly use Flats, “frames that connect to their neighbors, forming the overall desired shape. A flat consists of a light but strong framework that is usually clad with a lightweight sheet material, say thin plywood or canvas”(Blurton 79) Flats are shipped in four foot by eight foot sheets. If used properly, a flat can last up to fifteen years with as many layers of paint as

it needs. To create larger and more custom shapes, flats are cut and hinged together as needed.

The evolution of modular set design has based itself on faster set up, more efficient and structurally safer sets, using light steel sections to create stronger units, for example. Similar to the tradeshow industry, in the last few decades, steel has become more commonplace. Instead of using entirely wooden structures, steel is cheaper than timber and welding is an easy option for joining sections. Currently tradeshow have almost all moved to steel or aluminum structures, while set design still tend to combine the use of both wood and metal.

Probably the largest change to both the tradeshow industry and the theatre industry was the advancement of technology. For theatre the advances in sound production, lighting and image projection have played an integral part in expanding in modular scenery. For the tradeshow industry it was mainly the Internet, computers and kiosks. Before digital technology became affordable and accessible, company information was solely reliant on staff and graphics. Currently, it is almost impossible to walk by a booth without seeing at least one computer or TV screen. TV screens allow for instant company information and computers offer marketing options that face to face exchanges are not able to produce. Kiosks allow the customer to be interactive and browse company information without printing as much literature, keeping costs and waste down. Projection and LCD screens have pushed both theatre and exhibit designs even further to awe viewers and customers through effect and interactivity. For example, in the 2008 Exhibitor's show in Las Vegas displayed a promotion for the Adobe Creative Suite 3 products by placing an LCD screen on the wall. Whenever a person walked by, the screen would sense the person's movement and create a unique and intricate design that followed the motion of the person. The interactive promotion allowed those unfamiliar with the brand to be excited about the possibilities the Adobe products could offer. In the production of KA, a Cirque De Soleil production, the platform that acted as the main stage was also a giant LCD screen that the performers could stand on. In parts of the performance, the platform would be tilted toward the audience so when the performers touched the screen, the surface would respond and create the illusion of being water or sand.

Current Materials Used in Modular Exhibits

Designers also study how the use of space can have a certain effect on a person, such as theories of color effecting moods, human anthropometrics, the amount of light in a space, spatial relationships, and the art of

Fung Shui. While all these things play into how an exhibit or stage is created, a modular set design has limited options for creating feelings or moods and has therefore been considered more restrictive to creativity and innovation.

Although engineering and construction of spatial design has drastically improved, our culture has started to recognize that our resources are depleting. Designers have started to face new challenges concerning the environmental sustainability and re-usability of products used in the design of a space. Two of the most wasteful types of environmental design are the Tradeshow and Theatre set industries, usually because of a set's one-time use.

An exhibit or show exists not only to market the product and company, but it is also responsible to ensure the attendee leaves knowledgeable and excited. One of the concerns modular designers have working with is how to use similar pieces over again without being resigned in basic banners and kiosks. One solution came in the form of a Truss system, which has been widely popular, not only in exhibits, but in rock music shows. Trusses systems offer two major benefits to the structure of an exhibit: strength and lightweight. Trusses can be used to make large shapes or can be hung from the ceiling above an exhibit to support lights or the exhibit itself. "But there's also a dollar benefit in a simplified connection. It uses a pin clip that can be installed with no tools. No tools generally mean not having to hire outside labor for erection in a trade show" (Gray) Trusses are also useful for hiding electric cords in the center of its structure. (See Image Appedix-Truss System)

Pop-up displays have become more popular since their invention in the mid 1970's and are the most affordable solution for smaller companies and exhibits. The original pop-up led the way to produce more options in pop-up engineering. Small walls, literature racks, and tabletop displays were all created using similar engineering materials to the original pop-up. For instance, instead of just a flat wall, a client had the option of a slightly curved wall, or a combination of straight and curved walls. The new pop-ups use tension fabric for graphic paneling attached either by Velcro, magnets or zippers, and are structurally capable of having lights fastened to the top or small stands attached to the sides. Sizes can range from eight to ten feet high and most have a variety of widths available. (See Image Appendix-Pop Up Displays)

Another solution came in the form of a 'system'. A system is a basic few parts, or bones of a structure,

that slide and lock together to create a larger exhibit. Using lightweight aluminum or steel to create each module a company can use the same blueprint for the module and then cut each piece accordingly. The connectors in the system have inserts that are manufactured to fit into rivets in the beams that lock the structure into place. A system generally offers ten or so different types of connectors and four or five different types of beams. Using these modules, designers can re-configure a set or tradeshow to almost any size and shape the client desires. In the American tradeshow industry, a company may use the same set for five years or more with small additions or graphic changes to make the set look new and up-to-date. Systems are also easy to construct, de-construct and ship. An exhibit that uses a system would be able to be put up and taken down in a day and moved to be put up the next day. Most traveling tradeshow exhibits can be packaged in crates that if stacked together on the ground would only take up a five square feet of space. (See Image Appendix-Systems)

There are numerous exhibit companies that specialize in system design. Some of the most successful being Nimlok displays, Octonorm, Aluvision, and QuikWall, each of which have a unique approach to the system and provide different opportunities for modular exhibits. Many large-scale exhibit companies design their own systems for their designs and have all of the parts stored in-house for convenience and efficiency. The Freeman Corporation is a good example of this type of company. Freeman enjoys having the opportunity to provide their clients with a design, engineers and shipping all from the same company. Most Tradeshow design companies also offer rentable exhibits in which the graphics in the structure can be replaced with graphics specific to the client's need. This allows for simplicity and cost efficiency for both the customer and the company. "Rentals are also popular because they can solve problems beyond a lack of capital. They can be used when a specific exhibit size or configuration is required just once a year, for shows that overlap when regular exhibit inventory is in use elsewhere, for marketing testing, for international shows and for trying out an exhibit before making a purchase"(Exhibitor 2004, 28).

Fabric is the last of the major materials that are used in modular designs. Although tension fabric was invented as a solution in the early 1980's, it didn't become widely popular until approximately five years ago.

"It can create tremendous presence for a lower cost than many other, heavier materials" (Exhibitor 2004, 26). It wasn't until printing technology caught up with the idea of tension fabric graphics, that the products

started getting serious use. Now, printers are able to print on any fabric and can print on up to eight-foot long panels. Fabric graphics are also popular due to their flexibility in creating structures and their versatility in printing and lighting options. Fabric is also cheaper to manufacture and ship and doesn't have the limitations of conventional hard wall panels. Fabrics have the option of being printed on both sides and can be opaque as well as transparent. Companies such as Fabric Images, Moss Inc., and Pink Ink specialize in fabric structures. (See Image Appendix-Fabric)

The Push for Environmentally Friendly Design

Over the last few years, the term "Green" has become the new buzzword for environmental friendliness in many companies including the tradeshow industry. In Europe it is commonplace for exhibits to be built for a one-time use only. Companies overseas rarely use an exhibit twice, so each exhibit can be tailored specifically to the client's needs and request. The argument is that it is cheaper to build a custom set that lasts only a few days than to spend the money on designing modular solutions with travel expenses. Once the exhibit is used, it is burned. It may be economically friendly, but it is definitely not environmentally friendly. The United States functions under a different mindset. Many clients that pay for an exhibit booth want it to last as long as possible. The environmental advantages of having a long lasting set, or renting out an exhibit, is that once it is made, the structure will last until it has deteriorated or been destroyed. Most tradeshow designers sell their exhibits with the term "Green" stamped on the booth. However, most designers know that nothing they design can ever be truly environmentally friendly. The fact is, the tradeshow industry is the most wasteful type of advertising. The innovation of new materials that are being used in the industry are mainly more environmentally friendly than the conventional alternative. The use of Bamboo as a "Green" material is due to its fast growing rate and ability to be molded and made into different structures. Recycled materials have been reused to create new surface laminates, and extra woodchips and metal can be molded into useful new materials. Certain fabrics are being manufactured from PVC-free resins and contain no fungicides or phthalates. A few years ago, Foss Manufacturing Co. introduced a high-quality polyester fiber made out of 100 percent certified recycled plastic PET bottles.

The argument of environmental friendliness centers on the classic long term advantages versus the

short-term advantages. Building steel or aluminum structures takes more energy and coal use to manufacture, however the structure can last for years. Building a structure using wood or disposable elements may cost less short term but have eventual negative effects on the environment. Some argue that reusing materials is not considered “Green” since it takes energy to remake the extra parts into something new. However, others consider reusing leftover materials or products to create something new to be “Green”, since first hand natural resources were not used. The tradeshow industry will continue to make advances in improving the quality of exhibition sets with the help of technology and innovation. However, the industry must strive to be as eco-conscious as possible in a world where natural resources are in limited supply.

Part TWO

For the last 40 years, the Bemidji State University Choir has put on the annual Madrigal Dinner Show. The show is a Christmas community event that offers a three-course dinner, a student written play followed by a concert performed by the students of the choir and volunteers from the campus. The show has used the same set to create their castle-like environment and every year it is stored and re-built by the students. The problem is that the set was built to be a temporary set but has been used for the last 35 years. It has not only survived 35 years of use but it has also been transported to Minneapolis for shows. The set combines the use of Styrofoam, an unconventional staging material and wood. Screws, wing nuts and bolts feebly hold the set together. The current set is deteriorating to an unsafe state as fasteners rust and become useless, the wood dries up and cracks and the Styrofoam becomes more brittle and fragile every year. The choir is constantly fixing broken hinges and cracked wood. The set is in dire need to be reconstructed. Seizing the opportunity, I took on the task of finding a lasting and economical solution to a new Madrigal Dinner set.

For me, the Madrigal Dinner set was a perfect opportunity for mixing conventional set construction and new advancements in modular exhibition materials. The set needs to be a large workable set that is able to be broken down into small enough pieces to fit into the current storage space available. The set design is very simple and perfectly symmetrical. There is a front stage where most of the action happens, enclosed by a twelve-foot

back wall. Separate from the back wall are two identical sidewalls that project along the outer walls of the room to hide doorways and create the feeling of being inside a castle. These walls also contain a parapet each that provides visual interest and a stage opportunity. There is one small stage toward the back that acts as a separate staging area for small singing groups to perform and the actors to have another extra venue for a scene. The final touch is to add fresh cut pine trees throughout the ballroom to give the Madrigals a Christmas feeling.

Since I was involved in the choir and had specific biases as to how the set should function, I presented the problem to the Exhibit Design students who would be completely impartial to the current design and would be able to think unimpeded by the current set design. For me, it was a way to grab hold of a design that would add contrast and versatility to the different parts of the dinner and still be functional so I could tailor it to fit the exact needs of the whole operation. In talking with Mark Schmit, head instructor of the exhibit program in the Design Technology department, we came up with an aluminum tube and fabric solution that would perfectly fit our needs. The aluminum tubes could last longer than the wood without having to be constantly replaced and had no option for cracking. The fabric would be opaque and printed with a castle-rock design to maintain the castle feeling. The best part would be that the set would still be able to be built and deconstructed by members of the choir and the storage of the set would take up only half of the space that it currently uses.

Some of the things I wanted to accomplish with the new set were more opportunities for vocal and scene staging and versatility in presentation. Components of the show itself needed to be recognized in the design of the stage. The concept behind the design is that of a royal great hall from the Elizabethan era. For instance, the front stage needs to function as the Royal Court head table. The auditioned chamber choir plays the role of the royal court and two students of the chamber choir are chosen to play the King and Queen, who dictate most of the show onstage. Next steps or platforms leading up to the head table are needed to fit the full choir and act as a stage for parts of the play. Plus extra staging options for the play are needed to provide variety and a theatre-in-the-round feeling for the audience. The first new set that was designed was a set that had no boundaries beside the size restrictions of the Beaux Arts Ballroom and an accurate historical design. I wanted the designers in the exhibit class to be completely innovative.

The chosen set was composed of a longer front stage, with a staircase and one round parapet acting as

the center ornament and with the ability to sneak back stage without being seen directly. The back wall would preserve the current dimensions, and would be laden with stylized stained glass windows. On the immediate right of the main stage, would be a staircase leading up to a double deck on the audience's left hand side. The wall underneath would still act as a passage in and out of backstage and would extrude further down the Beaux Arts Ballroom wall than the current set does. The parapets would still be a key part of the wall also, but instead of using a square as in the current set, they would be round. On the opposing side, the wall would be a stage that could function not only as another venue for the play or small group singers, but an area where a harpsichord could be placed to add a more historical musical experience. This would also allow for a soloist to sing at the dinner, something that has never been done before. Along the audience's right side wall would be a stand-alone parapet with a drawbridge that opened to the main stage, and a back stage parapet was designed with a joining platform extruding from the base. The concept was asymmetrical but still balanced.

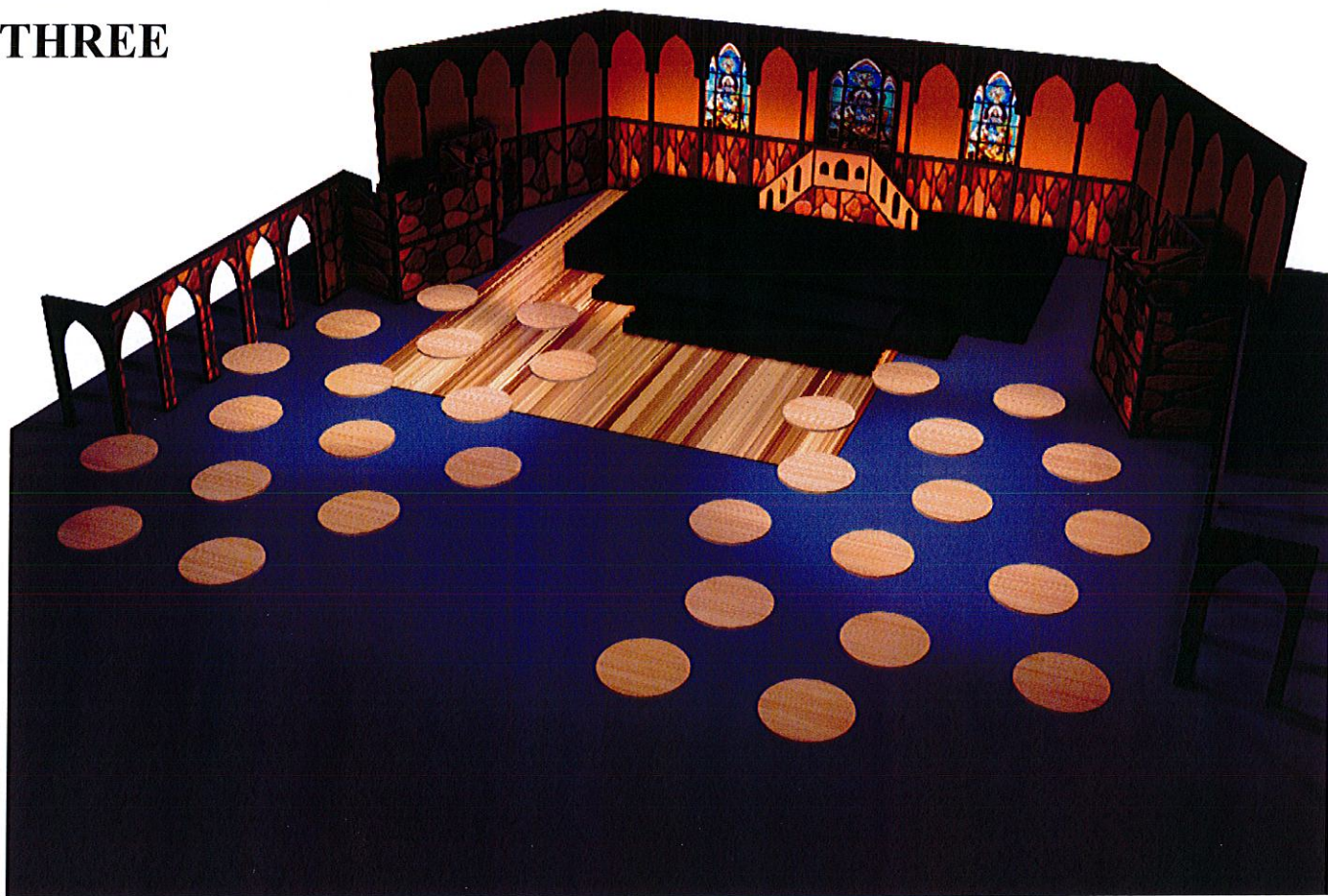
Once the concept was presented and chosen, I was able to mold it to fit the choir's exact needs. One problem we faced with the design was the height restriction on the castle walls, as they needed to be short enough to be used as staging, but tall enough to create a feeling of enclosure from the audience. Another major problem was configuring the set to be original and modern while still maintaining the same number of tables for the audience. When I felt the design worked in our favor, I sent the set along with measurements to Fabric Images, company that specialized in fabric structures, for a bid on cost.

Our first bid came out at \$130,000 dollars. Knowing that the set was extravagant and it was highly unlikely that we would be able to maintain all of the new features, it was still a startling number. Revisions needed to be made to fit a realistic budget. Eventually the back stage, the drawbridge and the double deck were removed to reduce the cost. After long and tedious hours of reconfiguring I was able to lower the final bid to \$40,000 dollars. Unfortunately this was still an unrealistic number. Funding was at an all-time low, and even if we received a sizable grant or a discount, we would still have to make the rest up with our own funds. The final production of the new set is unattainable due to current economics and limited fundraising opportunities. The state of the set however, will need to be reconstructed. Turning to a more conventional staging option, I spoke with Ellen Jones, head scene design instructor at Bemidji State to inquire about set changes that could be made.

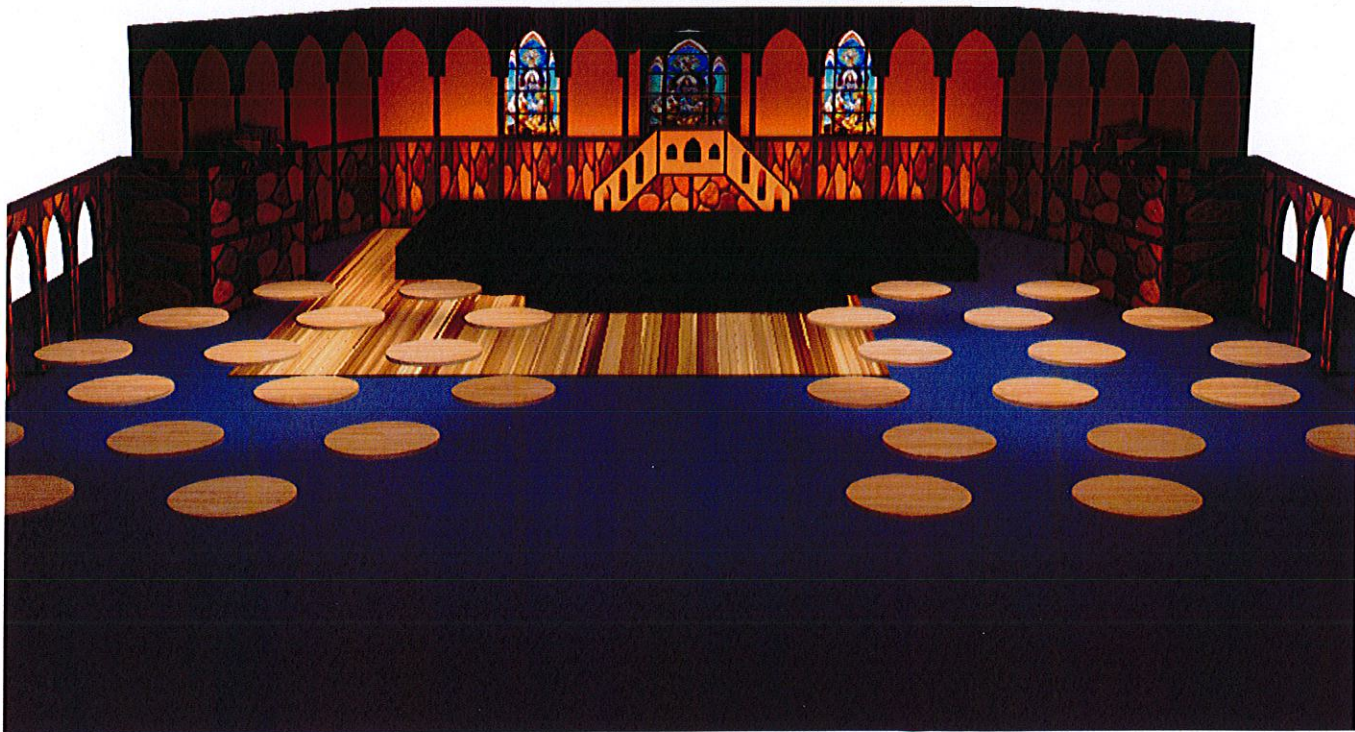
She was confident that the set could be easily built with the current design but constructed to be safer and with more durable materials. She suggested the use of flats and specialized brackets that could hold beams together in place of wing nuts and screws. The set would still require a large storage space and a day for set up and take down and wouldn't have the staging options the new set could offer. However, considering the budget, it is better to use the current blueprints of the Choir's set and rebuild it using new yet conventional staging materials then to wait for funding to follow through with the new set design.

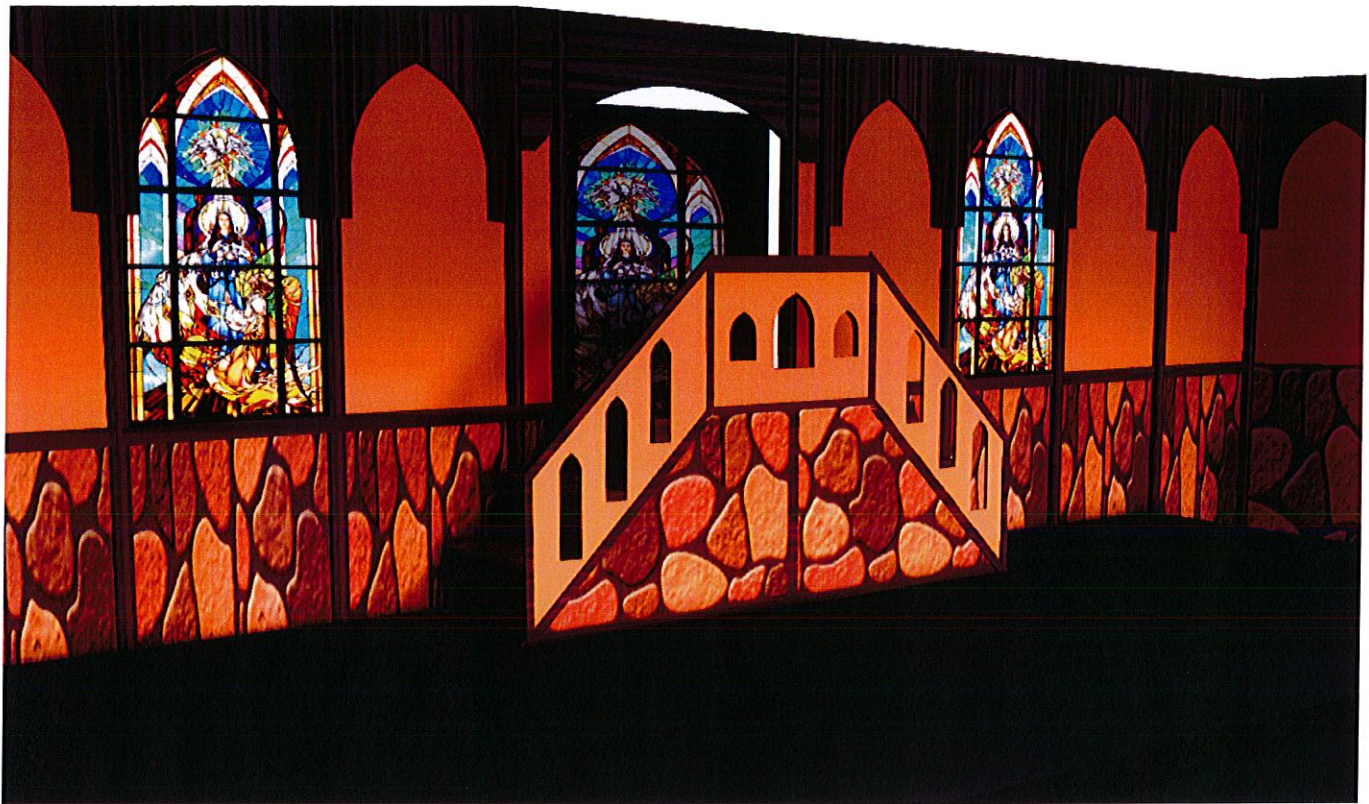
Despite the many attempts to lower the cost of the set and continual disappointments, I discovered more about the truth of the economics of the exhibiting industry than I would have not contacting Fabric Images. Realizing the actual cost of a design serious puts into perspective the designs I create in class and would be creating in a real-world situation. I feel as though I gained valuable knowledge about the inner workings of the exhibiting industry and will use that knowledge to further push my designs while being cost conscious and benefit future potential clients.

Part THREE



Current Madrigal Dinner Set

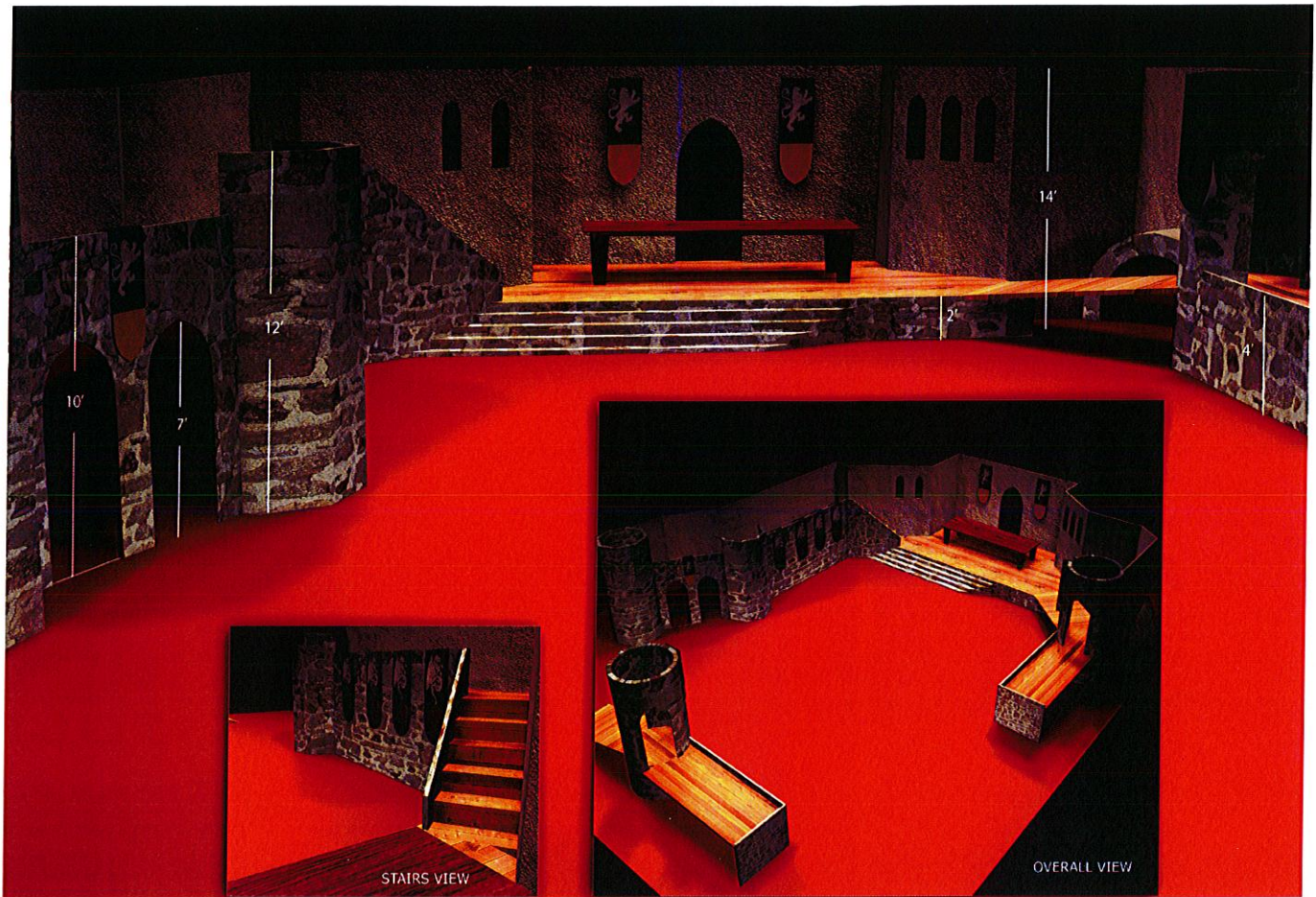




Main Stage and Center Piece

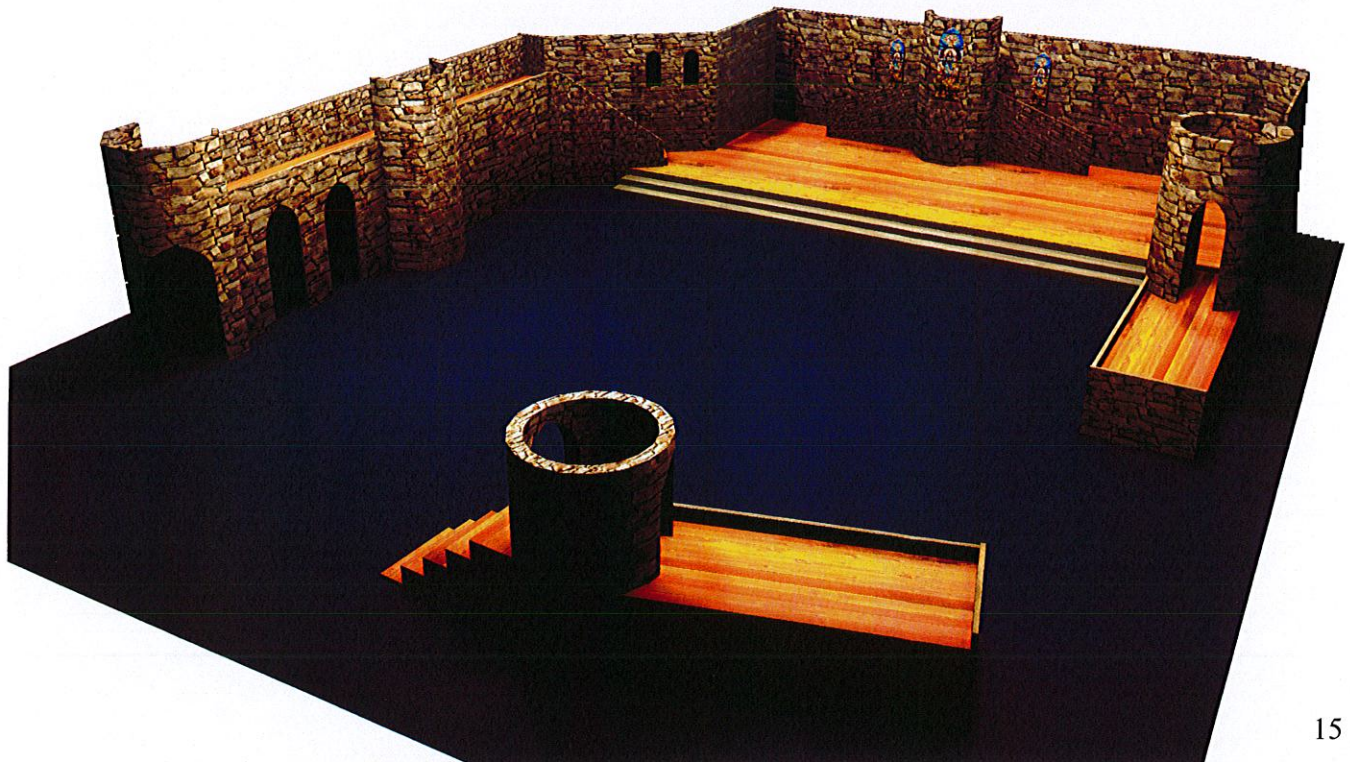
Stage Right Wall Extrusion





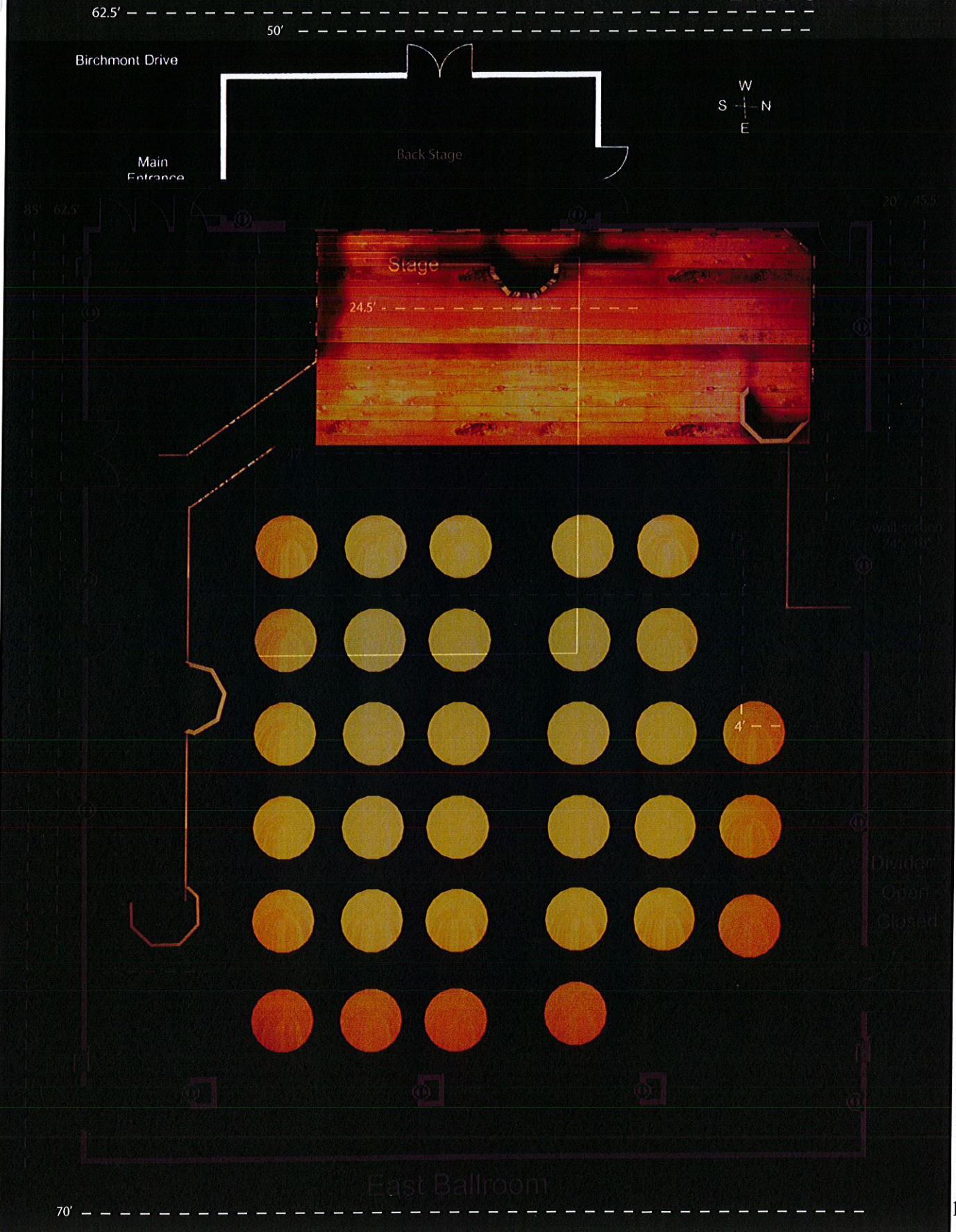
Original New Design Concept

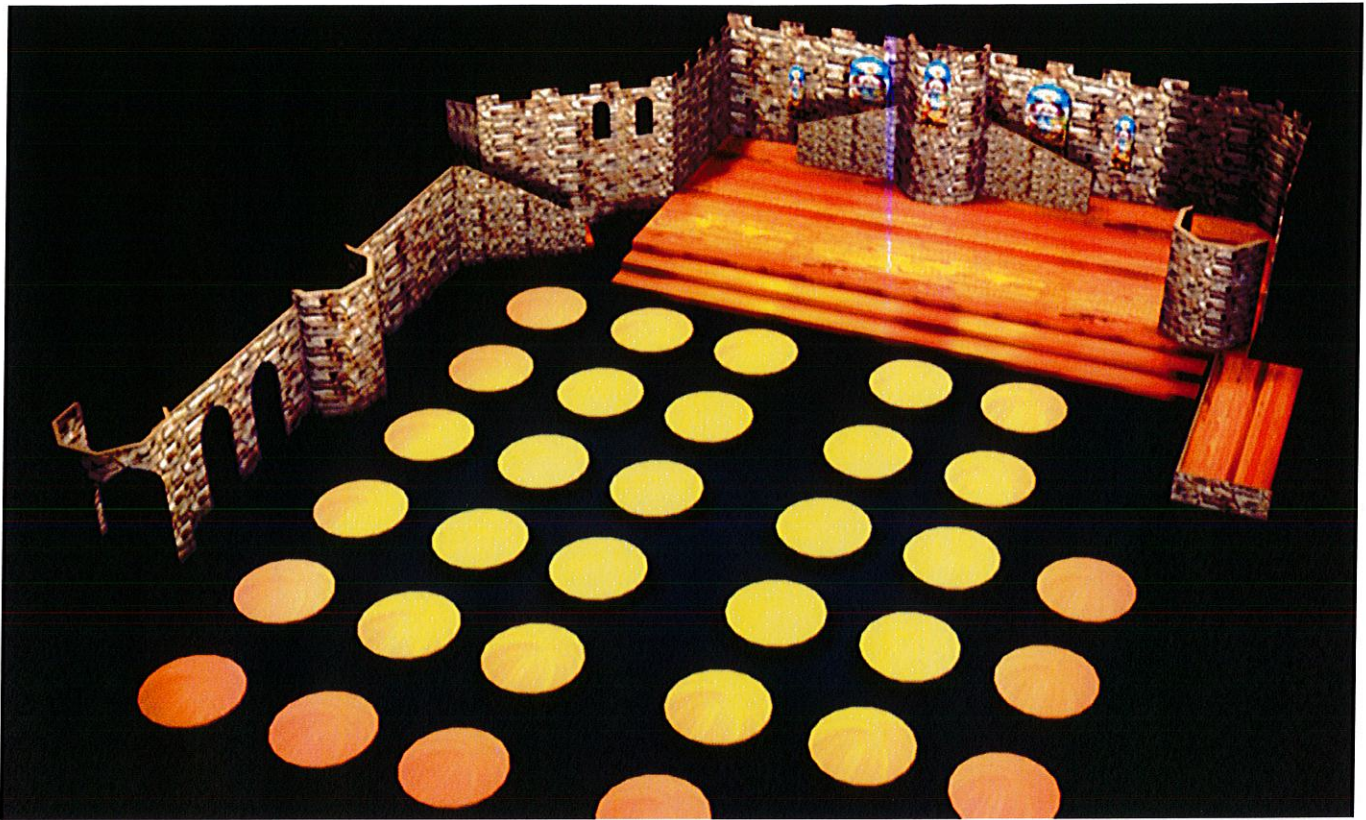
Revised Design Concept



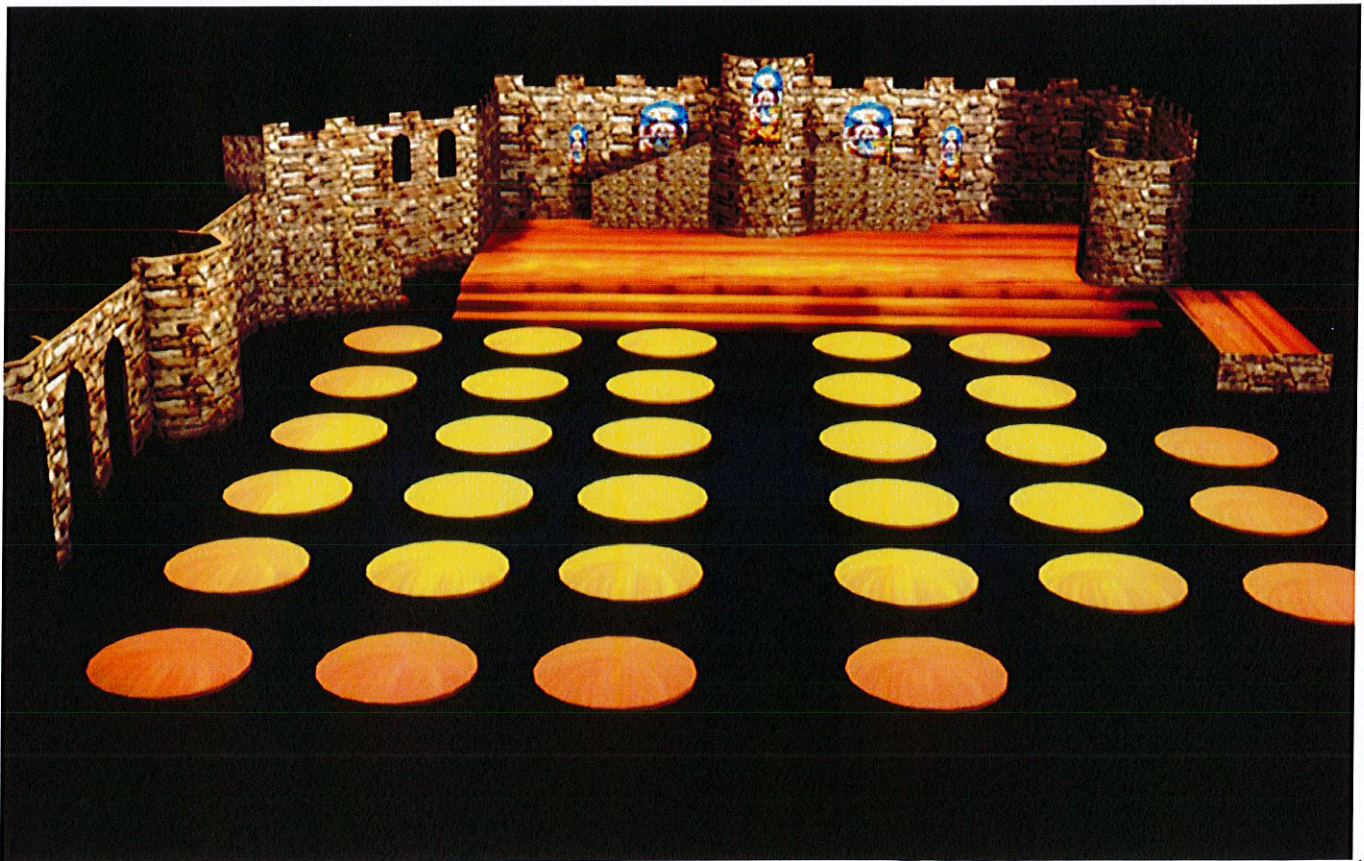
Madrigals

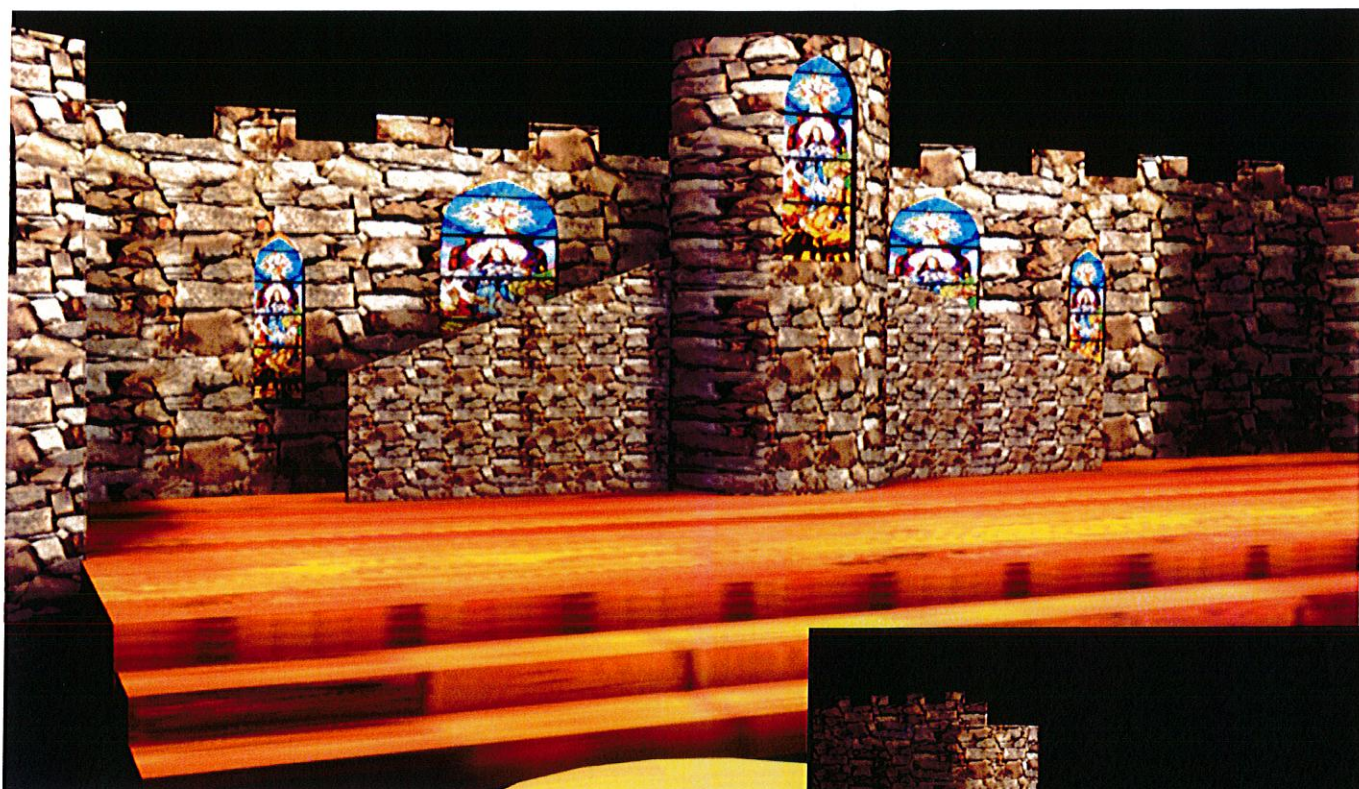
Final Design Dimensions





Final Design Concept





Main Stage and Center Piece

Stage Left Wall Extrusion



Stage Right Wall Extrusion

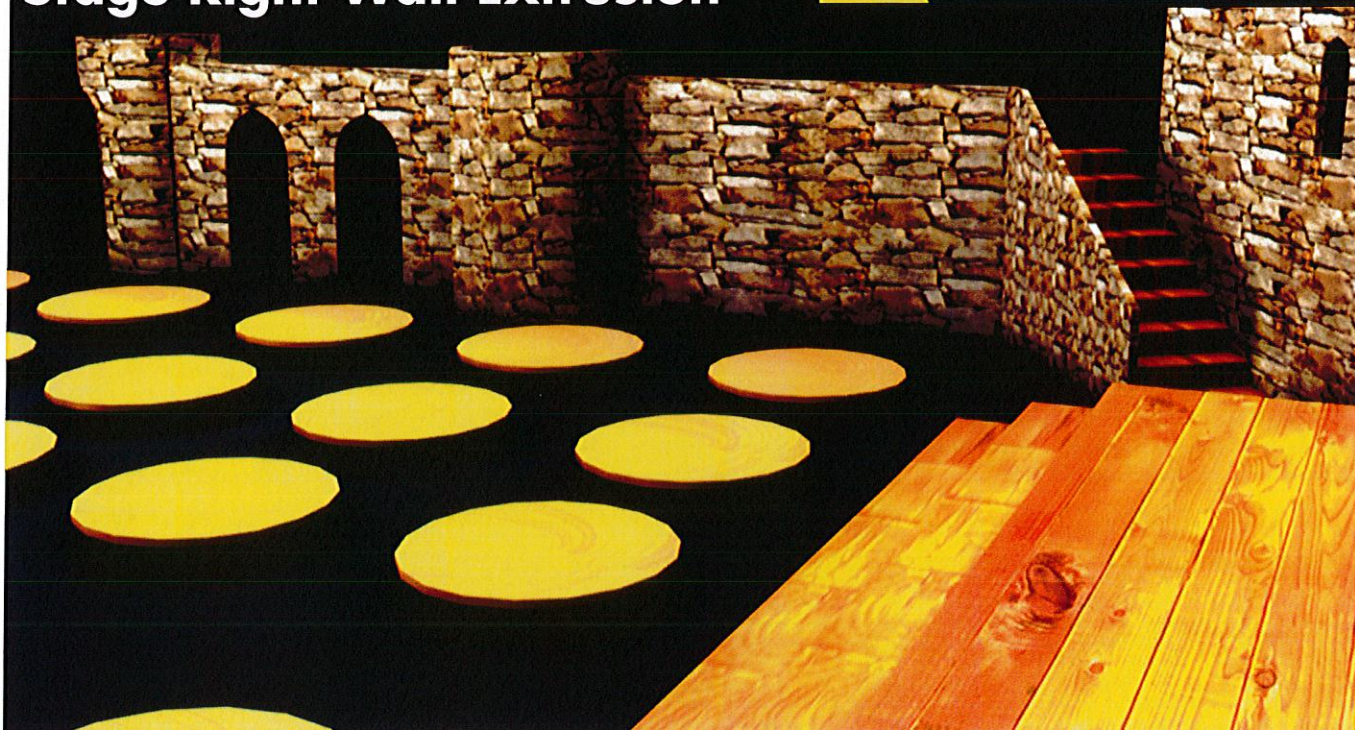
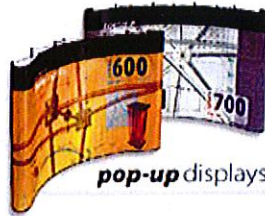
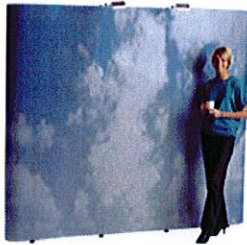
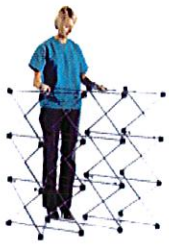


Image Appendix

(Impact Displays)



pop-up displays

posters & banners



accessories

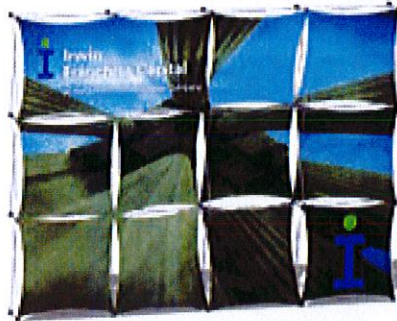


backlit displays

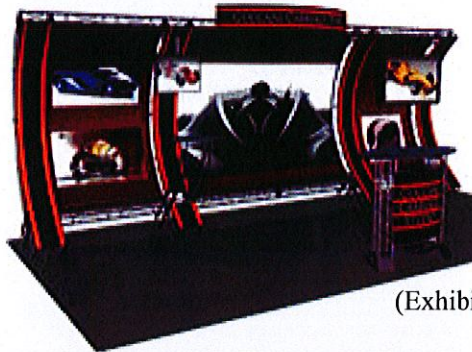
(Erawaent)

(Premex)

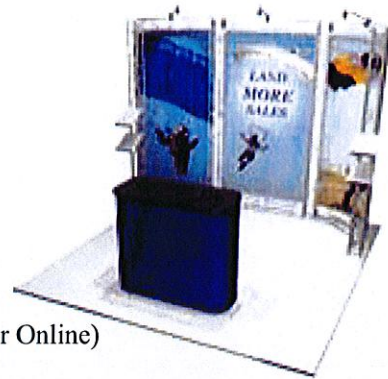
Pop - Up Displays



Truss Systems

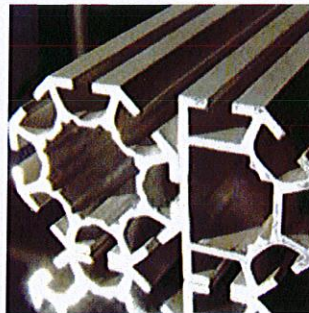


(Exhibitor Online)



System's

(Octanorm)



Tension Fabric

(Pink Inc.)



(P.O.P Exhibits Inc)

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