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GEOMETRIC SHAPES

by

Aruttapol Ruangkanjanases

A thesis submitted in partial fulfillment
of the requirements for the Master of
Fine Arts degree in Art
in the Graduate College of
The University of Iowa

May 2010

Thesis Supervisor: Associate Professor Isabel Barbuzza

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CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

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CHAPTER I

INTRODUCTION

I do not know what inspires me to use geometric shapes in my artwork. It may have started when I took my first jewelry and metalworking class in college. For one assignment, I had to find an artist and make an artwork that was inspired by his artworks. I chose Sol Lewitt. I had no idea who he was. The only thing that I knew was he might be an artist. I chose him because I simply liked one of his works; “Incomplete Opened Cubes”.

Since I started studying Jewelry and Metalwork, as well as Sculpture, at the University of Iowa, my artworks are still based on geometric shapes. I enjoy them because they are shapes that I see around me everyday; such as textbooks, chairs, doors etc. I also like geometric shapes because I feel like there is no complication to them. Furthermore, it is a challenge to change a simple thing to an interesting thing.

Sometimes I use geometric shapes by themselves to create artworks. I bend, fold, cut, and add the geometric shapes to make artworks. Additionally, I sometimes get ideas from products at merchandisers such as, Menards, Ace Hardware, and UI Surplus store etc. I also use their products in my works; including nails, a faucet, and a shower head to produce artworks. Moreover, I also get some inspiration from the catalogs that the school has or I own.

In my thesis, I will explain my artworks and the techniques that I used, why I made them, and what inspired me.

CHAPTER II

GEOMETRIC SHAPED ARTWORK

The Artwork of Geometric Shapes

In the following section I will summarize, and provide details to, the concepts of the most significant works in the exhibition with regard to the issues of using geometric shapes to create artworks.

Untitled #1 (The Brass)

First of all, I want to explain why I have to have the second name in (…) after the Untitled # name. I have never given any of my artworks a name because I feel that there is no meaning or interpretation that audiences have to know. I just want them to see my works and let them decide what they think about my work without any hint from the works' name. However, I have the second name in the (…) to give my friends an idea what piece that I am talking about right now. All the names are from each work's unique character.

On Untitled #1, I still depend on the techniques of soldering and forming; which I learned before I came to the University of Iowa. However, there are two new techniques that I learned on both of them. The first technique is a powder coating technique. Powder coating is a type of coating where resin powders are electro-statically charged and sprayed on the pre-heated metal surface. Then the powder is cured under heat (400 Fahrenheit) to allow it to flow and form a coating. Another technique was the use of the

3D modeling program, Rhinoceros.

For Untitled #1, I had no idea what I would make. I only knew that it has to be a container with a geometric shape. Then I got an idea to make an incomplete opened cube. I start by drawing the cone that I wanted in the 3D program. Next I unrolled the rectangular shape in the program. Unrolling, for example, can be imagined by thinking of a paper cube. When you cut and unfold it flat on the table, you will have six squares connected in a pattern that lay flat on the table.

From this unrolled pattern, I cut four brass rectangular pieces and one square, and I solder them together. To make the work interesting, I bent the corner of one of the panels out, and cut out a triangular piece of the panel next to the panel that I bent on the left. Then I cut a new triangle from another brass sheet and soldered the new triangle between the back of the bent panel, and the corner of the panel that I cut the triangular piece out of. Next to the triangle that I added, I solder another triangle. However, I designed this triangle to have a sharp point at one corner and a half circle at the end of the other two corners.

The idea behind adding a couple of triangular pieces to the main rectangular piece was to make contrasting shapes on the artwork. The round shape in the last triangle gives the piece different lines. Instead of having all straight lines, the curved lines create more movement on this artwork than the bended corner does. After all, the geometric shapes of the pieces on this work create a nice opened space on the top.

Additionally, for treating Untitled #1's exterior and interior, I powder coated flat black color on both interior and exterior. However, I decide not to powder coat the triangular piece that has a round end and polished it instead. So in this way, there is a

contrast between matte and shining surfaces. I also filed all the edges on the top to make the work have more contrasting elements.

Figure 1: Untitled #1 (The Brass)

Untitled #2 (The Triangles)

I can say that Untitled #2 marks big changes in my work. I switched from soft metals, copper and brass, to hard metals; such as stainless steel. I changed from soldering to welding. The tools that I used changed from small tools such as small files, sand papers, torch etc… to mechanical tools such as grinders, welding machines, angle die grinders etc. The ways of fabricating my work also changed because the material was stainless steel. It would take forever to fabricate the surface if grinding tools were not

used.

The concept of this work is similar to Untitled #1 which is using geometric shapes. This time it's a triangular shape. In order to prepare the material I must go through several computer programs. I started by designing the size of the three rectangular panels on the Rhinoceros 3D Modeling program. All three panels have straight lines, but they have different heights and shapes on the top. In the next step, I convert the .3dm file to .dxf file format for another computer program; AutoCAD. After I' m done with the AutoCAD program, I have to save a file as .CD; so I can use the file in the next program; Torchmate plasma cutting program. Then I save the file as .fgc file after I am done with the Torchmate program. The last step is to use the .fgc file with the CNC plasma cutting machine to cut the parts for the piece.

I used the CNC plasma cutting machine to cut the overall shape and one triangle for the bottom. Then I divided the sheet that I cut into three rectangles evenly. I scored the sheet following the lines that I marked and welded the two edges together to create the triangular shape. Each side of triangle has different designs on the top. The first panel is bent out at the lower corner on the top. The second panel was added by bending the triangle to make the panel look like it bent in. For the last panel, I added two small triangles. One is bent in; while another is bent out. At the bottom of the piece, I cut three tiny triangles and welded each of them to each inside corner. Then I drilled a hole on each triangle and three holes, each hole for each corner, on the bottom. All holes are the same size, so I could use a tap and die to hold the triangle and the bottom part together. For the finish, I chose to powder coat with flat black color again and filed the edges the same way I did on Untitled #2.

The concept of Untitled #2 is same as Untitled #1. However, the detail on Untitled #3 seems to be more complicated because there are more pieces that are bent in and out. Again, the top of the piece itself created fine opened spaces and shadows.

a. Front View

b. Back view

Figure 2: Untitled #2 (The Triangles)

Untitled #3 (The Rods)

After I used conical, rectangular, and triangular shapes, my ideas were stuck. Nevertheless I had an idea when I saw steel rods at Menards. I tried to think about how I should use steel rods on my work. Then I decided to cut steel rods to many pieces, and each rod had a different length. My design was to use the steel rods to wrap around the rectangular tube. After deciding that there was a problem; how could I weld each rod to

the rectangular tube, since it would be hard to clean all the welding lines? So my friends suggested to me that instead of welding one by one, I should weld the steel rods together first, and the steel rod pack should cover most of the surface on each side of the rectangular tube excepting the corners. I should weld the steel rods on the corners last. Then I should weld the steel rod pack to the tube's wall by facing the welding side to the wall and welding them together at the bottom of their pieces. After that I added some steel rods on each corner to fill the gapes.

The idea of Untitled #3 was to use the steel rods on my work. I tried to make my work more interesting. So when I cut the steel rods, I cut them at a sharp angle. I also turned all the steel rods to have different angles because I thought all the turned rods will produce a movement on the piece. Furthermore, I cut the top of the rectangular tube to make each side have different heights. I also cut the bottom of the rectangular tube to make it lean forward a little. I chose to do that because it will be better than standing straight. For the color, I chose flat black color again, and I put gold leaf on the top of all the steel rods to make a contrast on the surface.

Figure 3: Untitled #3 (The Rods)

Untitled #4 (The Faucet) and Untitled #5 (The Shower Head)

Untitled #5 and Untitled #6 are the first two pieces that I got an idea from things around me. The idea was to use something already existing as a tea spout. I found the subjects, a faucet and a shower head, when I went to Menards and ACE Hardware. I bought a faucet and a shower head that had gold color because I planned to use it with flat black color. After I got the spouts, I chose to use rectangular tubes again. The same ones as I used on Untitled #4. The next step was to put the spouts on to the pots. For the lids, I welded some spikes inside to create some detail.

Figure 4: Untitled #4 (The Faucet)

Figure 5: Untitled #5 (The Shower Head)

Untitled #6 (The Pearl) and Untitled #7 (Spike Teapot)

These two artworks work were started almost the same time after I decided to use hollow steel balls to create artwork. Moreover, another concept I used was geometric shapes to represent a subject. This time there were the hollow steel balls. For Untitled #6, the first idea that I got was to make it look like a pearl. After that I found pearl powder coating powder. Next, I figured out how to put the spout and the lid on the hollow steel ball. I decided to eliminate the spout because I felt that the spout would ruin my concept. So I just drilled a small hole to be the spout. Then I cut a hole on the hollow steel ball by using hollow saws. For the lid, I used two small domes that I cut from another hollow

steel ball. One dome is the lid that has a sharp rod at the center to fit to the hole of another dome. The other dome covers the hole that I cut before, and this dome would face down. In the last step, I powder coated the piece with the pearl powder.

Untitled #7 had the concept the work represented me. I wanted to present my character; Mohawk haircut and wearing white t-shirt. I chose to make the spout and the lid the same way that I did on Untitled #6. However, I did not use a hollow steel ball like Untitled #6, but I used two hollow steel hemispheres. For the detail on the Mohawk haircut, I chose to use nails to represent it. I drilled a big hole at the center of one of two hollow steel hemispheres. Then I drilled small holes for four lines and weld the nails in them to represent my Mohawk haircut. After that I welded the two hollow steel hemispheres together to make the body of the vessel. I also made the base by using another hollow steel hemisphere. I cut it to a curved shape, but one side is wider than another side. I thought it might make an interesting detail on the base piece.

For the finishing of the surface, there was a problem in powder coating two colors on this work. I wanted flat black color on the nails and white wrinkle color on the hollow ball and the lid. I asked the powder coating shop; even the owner said that it was impossible because the small gapes between the nails. So I decide to powder coat the hollow ball and the lid, and I painted the nails with flat black color. To make balance, I chose to powder coat the base with flat black color.

Figure 6: Untitled #6 (The Pearl)

Figure 7: Untitled #7 (The Spike Teapot)

Untitled #8 (The Spike Ball)

I had an idea to make Untitled #8 after I used nails on Untitled #7. I just wanted to make a sharp thing. This time I planned to use a solid steel sphere and put the nails all over the sphere. So I drilled many tiny holes on the sphere and cut the nails' heads off. Nevertheless, it was possible to weld all the nails to the steel sphere, but it was impossible to clean all the tacks or welding spots that I made because there was not enough space for the hand tools to go between the nails. Because of the problem, I found the solution was to use the cold-weld compound, J-B weld, to make the solid steel sphere be able to hold all the nails. In the end, there was still another problem; how to powder coat this piece because the steel sphere is too thick and there is no place to clip the connection for the powder coating system. Therefore, I decide to paint flat black color on Untitled #8.

Figure 8: Untitled #8 (The Spike Ball)

Untitled #9 (The Solid)

I continued using solid steel again. So I chose a solid steel rectangle. I also wanted to make it look like a sculpture and a container. I planned to craft my right palm on the surface. I began with spray color on my right palm. Next I looked for a place that I would place my palm on, and I grabbed the solid steel rectangle by my right palm. I waited until the paint dried. Then I carved away the solid steel rectangle where the paint covered the area with carbide burs and a die grinder until it was deep enough for my palm to fit in. After that I cleaned the surface with sanding discs on a grinder. To finish the piece, I put matte clear coat on the piece. Moreover, the rust detail happened on Untitled #9 accidently by humidity. It made the piece look better with more details.

Figure 9: Untitled #9 (The Solid)

Untitled #10 (Spike Ring) and Untitled #11 (The Bur)

Untitled #10 and Untitled #11 are the only two accessories in my artwork. The idea was to make sharp and pointy accessories. The Untitled #10 was inspired by Untitled #7 and Untitled #8. The pattern of the nails is like Untitled #8, and the size of the nails and color are similar to Untitled #9.

For Untitled #10, I used a small solid steel ball. Then I drilled the hole that was the same size as my pinkie through the steel ball to make a ring. After that I drilled small holes following the pattern that I marked. I cut all nails' heads off before I put them in the holes. Furthermore, like Untitled #8 I use J-B weld to attach the nails and the ring together. Then I powder coated it with flat black color.

For Untitled # 11, I wanted to make another sharp and pointy ring, but I decided not to use the same materials, nails and a solid steel ball. Accordingly, I used a bur and a steel tube instead. First, I found a steel tube that has enough thickness, and I cut it. Moreover, the ring has one side wide and the opposite side narrow. Then I cut out the middle between the narrow and wide parts. This made the ring incomplete and opened; the way Sol Lewitt's Incomplete Opened Cubes are. I also drilled one small hole in the narrow side. Next I cut the bur to the length that I wanted, and attached the bur in the hole by using J-B weld. To make it look similar to Untitled #10, I chose flat black color for Untitled #11.

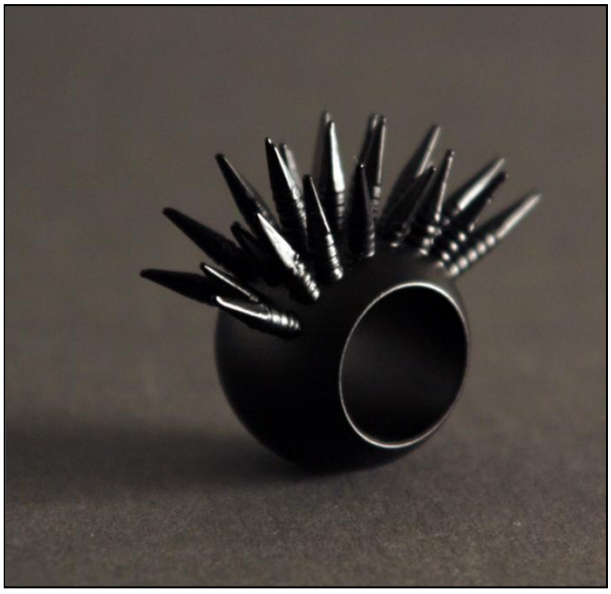

Figure 10: Untitled #10 (The Spike Ring)

Figure 11: Untitled #11 (The Bur)

Untitled # 12 (The Two Tubes)

The concept of Untitled #12 was to change a geometric subject to be artwork based on a subject's original shape. This time I was an inspiration when I saw a glass container from laboratory glassware at UI Surplus. I wanted to change it into a teapot. I designed a teapot base on the glass container. I cut two steel tubes so that they had different lengths. One was 2 inches shorter than another. Another part was a small solid steel ball that I drilled a hole through its face and another small hole on the side. I welded the solid steel ball that I drilled to the top of the short tube. I also welded a small tube onto the small hole to be a spout. Then I welded a small dome on the top and the bottom of the long tube and the bottom of the short tube. This made a connection between the short tube and the long tube. I welded solid steel rods on them. Additionally, I arranged

the rods to make the two tubes have a little perspective. I also wanted to change them from their original positions. I again chose flat black color for the teapot. Moreover, I wanted to have a base to hold the teapot. So I used a solid steel triangular block that I drilled a hole for holding the teapot. For the base, I chose an orange brown color because I thought it was a good match with the flat black color.

Figure 12: Untitled #12 (The Two Tubes)

Untitled #13 (The Box)

For Untitled #13, I went back to the concept that of using geometric shapes to represent a subject. The thing that inspired me on Untitled #13 was Sudoku. I got the idea when I read The Daily Iowan. There was always a Sudoku game on the last page. One day I thought that I wanted to make an artwork that was related to the game. This project made me using Rhinoceros 3D modeling program again. I started designing in Rhinoceros to make a box. In this box, there were four small rectangular panels and two big squares. I drew nine small holes in one of the two big squares. There were nine small holes in one of the two big squares.

In a Sudoku game, there are 9 by 9 square, and there are 3 by 3 subsections of the 9 by 9 square. The way to play the game is, every nine rows must have all numbers 1 to 9 in order, every nine columns must also have all numbers 1 to 9 in order, and each 3 by 3 subsection must have all numbers 1 to 9.

For Untitled #13, I used the previous days' Sudoku on from the newspaper to know how to put all the numbers together. Then I chose number 9s that the nine holes in the big square to be represented. After all the processes on the computer programs, I chose to use steel for Untitled #13 , and got all parts cut by using the CNC plasma cutting machine. Moreover, I wanted to add some details on the square that had nine small holes. So I planned to etch lines that made small nine holes look connected. I put tape on the square where I wanted to have lines. I sprayed paint all over the squares on both sides and waited until the paint was dry. Then I peeled all the tape off, and put the square in a glass container with Nitric Acid. After the etching was done, I welded all 4 panels, the base, and the top to create a box.

To have a box with holes was too plain. That is why I added nine square tubes. All the tops of the square tubes were cut to sharp angles, and all the bottoms of the square tubes were closed with a small square by welding. As usual, I finished the work with powder coat. I chose flat black color for all tubes. However, I did not use powder coat for the box. To make an orange-brown color on the box, I used Nitric Acid. I also painted flat black color on all lines.

Figure 13: Untitled #13 (The Box)

Untitled #14 (The Stainless)

The concept was to use geometric shaped subjects to create artwork based on the subject's original shape. I got an idea and a basic shape from Chinese art history's textbook, "*Chinese Art & Culture"* by Robert L. Thorp and Richard Ellis Vinogard; when I take an art history class. The concept came out when I tried to see all the artworks in the textbook. The concept was to make an artwork that was based on Chinese artworks in the textbook. The image that I chose was the 2-14 image, "Man and beast" motif on ceremonial axe, on page 80.

I made sketches and designed an axe shape to be a teapot by putting the sharp part down. I also designed the base to be curve and have a slot at the center, and the handle to be a long stripe with the ring at the end. For the spout, I put a strip to cover the top of the teapot. However, I did not use the strip to cover the entire top, but I left a small gap to be a spout. I made all the parts and details in Rhinoceros, 3D modeling program, cut them on a stainless steel sheet by CNC plasma cutting machine. Then I welded all the parts together. For the base, I bent it by using a roller. To complete the work, I powder coated the teapot with flat black and the base with orange-brown.

Figure 14: Untitled #14 (The Stainless)

Untitled #15 (The Heavy)

The concept was still the same as Untitled #14. Untitled #15 is another artwork that is inspired by Chinese artwork in the textbook, *"Chinese Art & Culture"* like Untitled #14. The idea was from 1-17 image on page 45. The image was a pitcher that has round corners, round edges, and three legs. I basically changed everything to rectangles or squares, and every corner and edge became sharp. I drew my design in the 3D modeling program, Rhinoceros, and cut a steel sheet with the CNC plasma cutting

machine. After that I welded some parts together to make seven main parts. There were two legs, a spout, a body, and a tail with an opened top, a top part of tail, and a handle.

First step, I drilled two small holes at the bottom of the body and a hole on the top of each leg. Then I used nuts and bolts to hold the two legs with the body. I drilled four small holes around the opened space on the top of the body, and welded a small steel rod in each hole. I also left three quarter inch rods from the holes. I matched each rod under the spout to each hole on the top of the body and welded all rods to the body, so the spout and the body were held together.

In the second step, I drilled two holes at the bottom of the handle and welded two rods into the two holes at the bottom. I drilled two holes in vertical order on the back of the spout and welded a rod in each hole. I left half inch rods in each hole. Then I marked two spots that two rods at the bottom of the handle touched the top part of the tail. I drilled the holes the same size as the rods. I put the handle on the top part of the tail by matching the rods to the holes and welded the rods to the bottom of the tail's top part.

In the third step, I welded the parts from the first step to the opened-top tail. However I could not weld the connections between the pieces because I wanted the artwork to have all sharp angles. The reason that I cannot weld is, when you weld two edges together at 90 degree angle, the heat will melt the sharp corner into a rounded corner. You may be able to change the rounded corner into a sharp corner again by filing, but it may take triple the time or more to make clean sharp angle. The solution was to tack welding, and it should be strong enough to hold the pieces together. I tack welded connections, the right corner, left corner, and the bottom, between the parts from the first step and the opened-top tail.

The last step was to assemble the parts from the second step, the handle and the tail's top part, to the parts from the third step. I marked where the two rods on the back of the spout touching the front of the handle and drilled them. I matched the two rods to the holes that I just drilled and the tail's top part to the opened-top tail.

For the powder coating step, I did powder coat with black wrinkle and file it out on the top of the spout and the handle. There was a problem because the surface was not even. It happened because the steel that I use was too thick, half-inch thick. This thickness made it hard to control the temperature when the heat cures the powder. The sharp angles also made it difficult for the powder to catch onto the surface. Because of that I had to spray the powder many times, and it left chunks of powder after it cured by heat. Even though I like my work clean, I had to stay with the result that I had because I thought the powder coating surface looked better than painted surface.

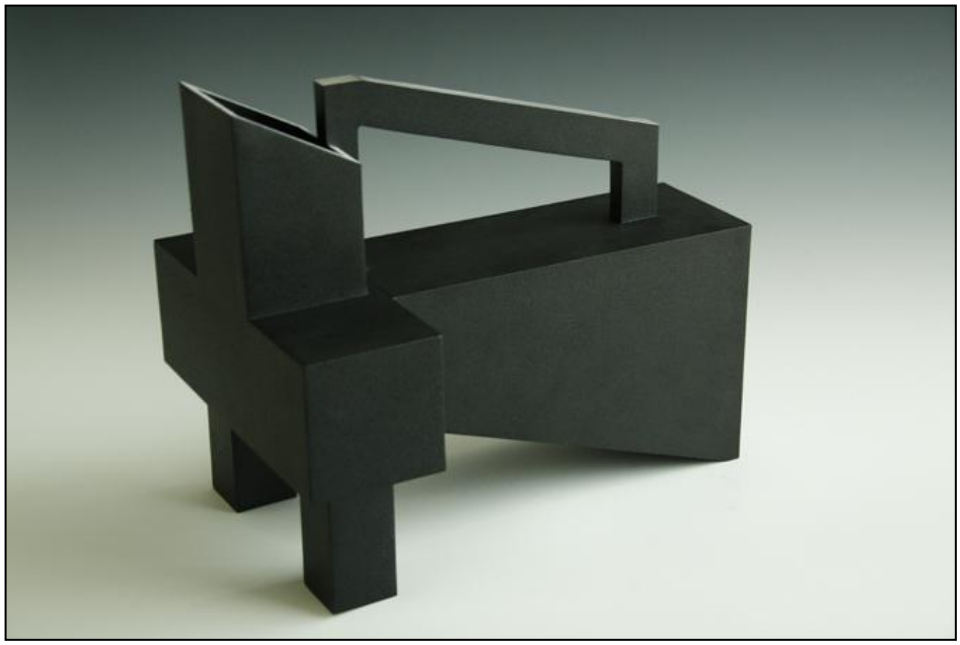

Figure 15: Untitled #15 (The Heavy)

Untitled #16 (The Bong)

Untitled #16 was another artwork that was inspired by laboratory glassware, and I tried to use the subject's original shape to create artwork. For Untitled #16, I found the idea from the picture in the *Sigma-Aldrich Catalog* at Studio Art. It was called "Deoxygenation Apparatus". According to *Sigma-Aldrich Catalog*, it was a one-piece condenser/flask unit, and there are angled joints and a 7 mm gas dispersion tube with glass stopcock (38). The original shape and detail are a long glass tube that had another tiny a glass at the bottom connecting to a glass ball. There are also a couple of small spouts at the top side and the bottom side; and another bigger spout on the glass ball.

I truncated the small details and left only the main shape. I changed the size, length, and width of the original detail. It was like I stretched the subject all over. The most noticeable part may be the small tube that connects between the long glass tube and the glass ball. I changed it to six times longer, approximately.

The material that I used for the laboratory glassware is steel. I used 8 inches of 1" diameter tube, a small steel tube, and a solid steel ball. Next I thought about the base; what shape would be good for the piece. Since I used a small steel block before on Untitled #12, I planned to use it again. However, this time the base was huge and heavier than the base of Untitled #12. It was a 4" by 4" solid square and a foot long. Because the bottom of the top piece was round, and the surface of the base was flat, I drilled a hole at the bottom of the top piece before I welded all the parts together. I also drilled a hole at the center of the base's top surface; so I can put a cylinder magnet, Neodymium magnet, in each hole. The two magnets would hold the top piece and the base together.

For the final detail, for the color of the both parts' surface, I chose to plate chromium on the top piece, and to make the base rusty. I chose chromium because I thought the reflection on the piece when the lights hit it made good contrast with the matte and rusty surface of the base.

Figure 16: Untitled #16 (The Bong)

CHAPTER III

CONCLUSION

Geometric Shapes the thesis describes the concepts of my artworks. There are three main concepts: to use geometric shapes in creating an artwork, to use geometric shapes to represent a subject, and to change a geometric subject to be an artwork based on a subject's original shape. People may think these concepts may be too easy and less complicated. I do agree with that thought. However, to use easy and less complicated concepts does not mean that they will make my artworks of less quality.

I prefer to have these simple concepts that I am able to explain or talk about; rather than complicated concepts and very deep meaning artwork that I will have a hard times to describe. Moreover, I prefer to have well made simple artwork and concepts; rather than simple artwork while trying to make the concept complicated and hard to understand.

After you read my thesis and see my works, you may wonder why they are so plain because they are just geometric shapes and less philosophy. Nevertheless, you also think that my artworks are interesting. I would be glad if you think and feel that way because that is what I want to represent with my works; to make a simple thing into an interesting thing.

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