ISSN No:-2456-2165

Fast, Easier and Effective Approach to the Fabrication of a 3D Logo from a 2D Concept

[1]Agyeman, K. K., [2]Quaye, H. A. [3]Clement F. A, and [4]Ofori, S. K. D
[1,2&3]Department of Integrated Rural Art and Industry, Faculty of Art,
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
[4]AsanSka College of Design and Technology, Accra

Abstract:- There are different ways of executing two dimensional (2D) logos into three dimensional (3D) concepts in metals. However, most of these approaches may be painstaking as well as material intensive. In this regard this paper demonstrates the use of metals in the execution of a 3D logo from a 2D format using a simpler approach. In this regard, a logo was chosen randomly, analysed and further elaborated with 3D software (Rhinoceros). The research drew a construction plan with mild steel as the base material. To this effect the plan was blown to actual size, followed by subsequent development of templates. The templates led to the production and assembling of the members to achieve the 3D logo. The members of the logo were mounted by rod projections. The logo was further treated in the colours of the logo. The result of which is a relief logo in the "off the wall fashion" in the blooming colours of the sampled logo. The logo was mounted on a mock wall and framed.

Keywords:- *Logo, Three Dimensional Logo, Two Dimensional Logo, Metal Technique, Fabrication.*

I. INTRODUCTION

This paper promulgates a fast, easier and effective approach to the execution of 3D logo. This concept was motivated by the limited resources at the disposal of some technical personnel, especially in a developing country like Ghana. In spite of the scarce resources there are demand on the local industries to product three dimensional logos (3D) logos based on two dimensional (2D) concepts of logos. In this regard, the processes to this end sometimes becomes challenging. This paper is therefore put together to provide ideas related to a more stress-free approach to augment other existing approaches.

Kang (2013), States that a logo serves three main functions: Identification, Distinction and Communication. In a quick symbolic way, a logo represents a company to the outside world. Often, a logo is the first thing a potential customer sees. It is a first impression, which is very important. If designed well, a logo helps to distinguish an organisation, providing a way for customers to recognize and select one organisation amidst similar organisations. This means that a logo must be unique. Also, a logo communicates something about an organization. This communication can be direct or subtle, but it says something about the organization it represents. Therefore, a logo must be unique, classy, trustworthy, serious and very attractive. So the question becomes how a 2D logo can be interpreted attractively in three dimensions.

➢ *Review of Literature*

A logo is a design that symbolizes one's organization. It is a design that is used by an organization for its letterhead, advertising materials, and the emblems by which the organization can be identified; also known as the logotype. (Logobee.com, 2013). McAdams (2013) , also defines certain qualities a good logo should possess. These qualities are brevity, clarity, effectiveness, versatility and easy to identify.

According to Kwambenya (2012), a three dimensional art form is an artefact which has length, breadth and depth. Such artefacts are mostly seen at all angles and are simply not flat. Olexa (2013) states that three dimension or 3D has become the most popular trend in the world of visual designs. Successfully promoted by modern television and the movie industry, today, three dimensional pictures start to penetrate into many adjacent fields. One of them is the logo design. The following he states as characteristics of a good logo:

- Three dimensional logos are easy to distinguish.
- They are clean and clear with distinct effects.
- Such logos are authentic, innovative and have an advanced conceptual background.
- Three dimensional logos create the appropriate image for a business initiative.

The official symbol of the selected logo as shown in figure 1, has five parts made of *An orange ring* symbolizing independence, energy and balance; *An orange inscription: CASS*; An orange stool; *An open book*; and *A violet circle*.

Fig 1:- Corel draw *version* of the selected logo

According to SCOTT(2013), steel is made up of carbon and iron, with more iron than carbon. In fact, at the most, steel can have about 2.1% carbon. Mild steel is one of the most commonly used construction materials. It is very strong and can be made from readily available natural materials. It is known as mild steel because of its relatively low carbon content. Regarding finishing, Farrow & Ball.com (2013), states that the best finishes for outdoor logos must be oil based. It must be beautiful to look at and must have superior performance. Pate (2013), however suggests the limitless application of metal finishes in a wide variety of areas by artists and technicians.

According to SCOTT(2013), steel is made up of carbon and iron, with more iron than carbon. In fact, at the most, steel can have about 2.1% carbon. Mild steel is one of the most commonly used construction materials. It is very strong and can be made from readily available natural materials. It is known as mild steel because of its relatively low carbon content. Regarding finishing, Farrow & Ball.com (2013), states that the best finishes for outdoor logos must be oil based. It must be beautiful to look at and must have superior performance. Pate (2013), however suggests the limitless application of metal finishes in a wide variety of areas by artists and technicians.

According to Howard (2013), Cutting metal with a saw is similar to cutting wood with a saw. The main difference is that the cutting blade is thinner and the teeth are smaller. The blade also moves at a faster rate. Large industrial saws can cut thick blocks of steel and are limited only by the size of the machine. Smith (2013), on the other hand states that a cold chisel is used to chip away at a metal while it is "cold" or after it has been forged and hammered. The process of cutting a metal with the cold chisel is known as cold chiselling.

II. MATERIALS AND METHODS

A. *Materials*

Mild steel is the main material employed in the study. Other materials includes: diesel, epoxy, anti-rust paint, primer, and enamel paint were uses for cleaning rust form metals, holding of finished metal parts together, protection of metal surfaces form rusting later, preparing the surface for finishing and painting respectively.

B. *Methods*

This study adopted both the qualitative and quantitative approaches. According to Kermis (1988) definition of action research, the researchers tried out an idea in a practice with the views to changing situation. This was coupled with evaluation: judgment about the effectiveness, relevance and efficiency. The experimental research design of the Quantitative approach was also employed in the application of forming, constructional and colour mixing techniques. Metal forming techniques employed include piercing, sawing, cold chiseling and welding. Finishes however, were applied using the spraying techniques.

There are five fundamental processes involved in the working process. These are: the 3D analysis of the 2D logo; the Scaling of the logo and template development; Fabrication and finishing processes; Assembling of parts and finally, mounting of the finished work on a wooding surface.

- *3D analysis of the 2D logo*

This is a virtual interpretation of the logo in a three dimensional form. Here, all flaws in the sketch model were corrected using a 3D Rhinoceros virtual modelling software. This was done to analyze the parts of the logo regarding the 3D effect. As shown in figs 2 and 3.

Fig 2:- Front view of the rhino model.

Fig 3:- A perspective view of the rhino model

➢ *Scaling and template development*

The logo was scaled up using the CorelDraw 2D software to enable a template development to the actual size. The scale for this model was 91.44cm x 91.44cm which covers an area of about 26,278.3 sq. cm. This was printed on an A1 paper size (figure 4 and 5) using a plotter for each of the five parts of the logo (*The ring, The circle, The inscription 'CASS', The stool, and The open book*) were cut out as shown in figure 6,7 and 8.

Fig 4:- Life-size printing of the components of the logo.

Fig 5:- The life size of the logo, 3ft x 3ft.

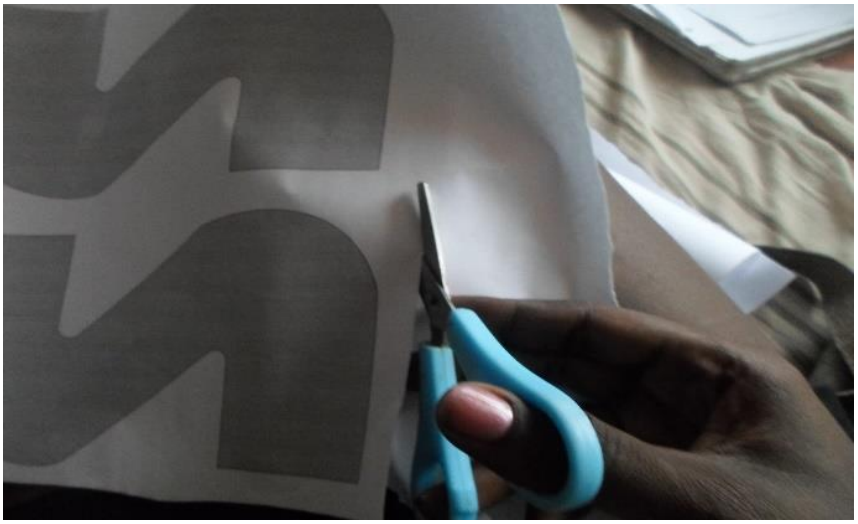

Fig 6:- Cutting out of the templates.

Fig 7:- Some cut-out templates.

Fig 8:- Cut out template of the book

➢ *Fabrication and finishing processes*

During the fabrication process the mild steel sheet went through Marking out, Piercing and sawing, Welding, Grinding and Filing as follows.

- *Marking out*

The templates cut out were placed on the steel sheet and traced with a permanent marker as shown in Figure 9.

Fig 9:- Marking out on the mild steel sheet

- *Piercing and sawing*

A hand steel cutter, the hacksaw and the cold chisels were used to cut the different parts of the logo according to the templates as shown in figure 10, 11 and 12. The variations of the cutting devices were employed because of the differences in the sizes and curves of the different parts.

Fig 10:- Cutting with the hand steel cutter

Fig 11:- Cold chiselling of the members

Fig 12:- Sawing with the hacksaw

- *Welding*

Spokes (1/4" iron rod) of 7cm, 10 cm and 20cm were cut and welded to the back of the components. As shown in Figure 13, the 20cm long spokes were welded to the back of the circle and the ring, whereas the 10cm spokes were welded to the back of the stool. The 7cm long spokes were welded to the back of the letters and the book. The results for the CASS letters of this process are shown in Figure 14.

Fig 13:- Welding of the spokes to the back of the components

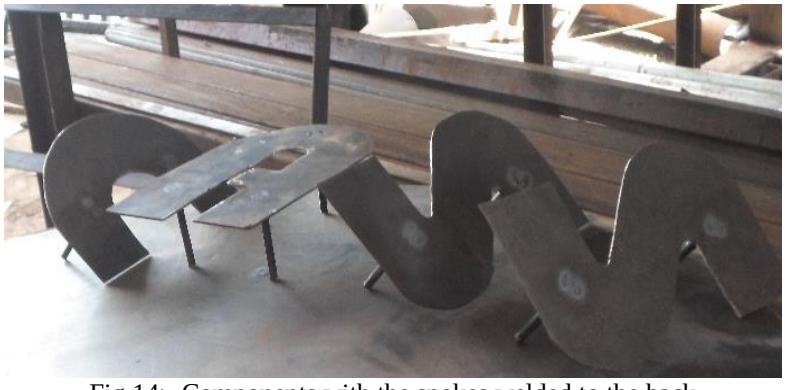

Fig 14:- Components with the spokes welded to the back

The parts were then aligned and the points where the spokes must penetrated their respective surfaces were marked as shown in figure 15 and 16. The hole were then drilled to accommodate the connectors (spokes). The parts were test assembled (figure 17) with respective parts: 4 cm above their respective surfaces as shown in figure 18.

Fig 15:- Marking out of the book for the drilling of the holes.

Fig 16:- Mark out of points on the circle that will accommodate the fasteners.

Fig 17:- A trial assemblage to ensure that all parts fit

Fig 18:- View of the parts after assemblage

- *Grinding and Filing*

All the components of the logo were grinded and filed to smoothen all edges and to precision as shown in figure 19 and 20. The grinding was also done to make the edges safe for use.

Fig 19:- Grinding of the components' edges to straighten them

Fig 20:- Filing of the edges and pierced holes

➢ *Finishing*

The finishing involved three processes: Rust removal, Priming and then the final Spraying as follows:

- *Rust removal*

Due to the fact the mild steel had rusted over the process, the individual components were washed thoroughly with diesel to remove the rust as shown in figure 21. These components were scrubbed clean with a scratch brush and abrasive paper to rid it of all rust.

Fig 21:- Washing of components with diesel and abrasive paper to remove rust

The components were washed with a foam and detergent to clear of all oil residue deposited on the surface of the metal as shown in figure 22. The result of this is shown in figure 23.

Fig 22:- Washing of the surface to remove oil residue from the anti-rust treatment.

ISSN No:-2456-2165

Fig 23:- The surface of the sheet after the anti-rust treatment

- *Priming*

The surfaces of the members were sprayed with a primer to prepare them for the colour treatment as shown in figure 24. The priming was done and the surfaces were sanded three times to ensure a smooth and levelled finish. The surfaces of the metal sheets were wiped clean and dried in the sun to make way for spraying.

Fig 24:- Priming of the surface.

ISSN No:-2456-2165

Fig 25:- Primed surfaces.

- *Spraying*

The primed and sanded parts as shown in figure 25 were sprayed with enamel paint mixed to the colours of the logo as shown in figure 26. The colour mixing was done prior to the spraying with the aid of a coloured print of the logo in figure 27. The white surface was sprayed first, followed by the orange colour, then the violet. The brighter colours were sprayed first and stored to prevent the destruction of the hue since just one spraying barrel was used. This was done three times each and allowed to dry after each spraying. Some of the sprayed surfaces are shown in figures 28 and 29.

Fig 26:- mixing of the auto- based paint for spraying.

ISSN No:-2456-2165

Fig 27:- the colour chart for the mixing of the paint

Fig 28:- Spraying of the surfaces

Fig 29:- Some sprayed surfaces

➢ *Assembling*

The components were assembled into the logo and Clare epoxy adhesive was employed to hold the joints in place. This was chosen to prevent discolouring of the joints. The assembled logo is shown in Plate 30.

Fig 30:- Assembled logo

➢ *Mounting*

The surface of the 121.92 cm by 121.92 cm large plywood was prepared and painted three times with acrylic paint as shown in plates 31 to 35. The surface of the prepared board was marked out and holes were drilled to accommodate the connectors of the logo. The logo was fixed into the holes on the surface to serves as a substitute for the wall as in plate 36.

Fig 31:- Plywood for mounting of the logo

Fig 32:- Preparation of the plywood for mounting

Fig 33:- Sanding of the first and second acrylic surface for the final coating

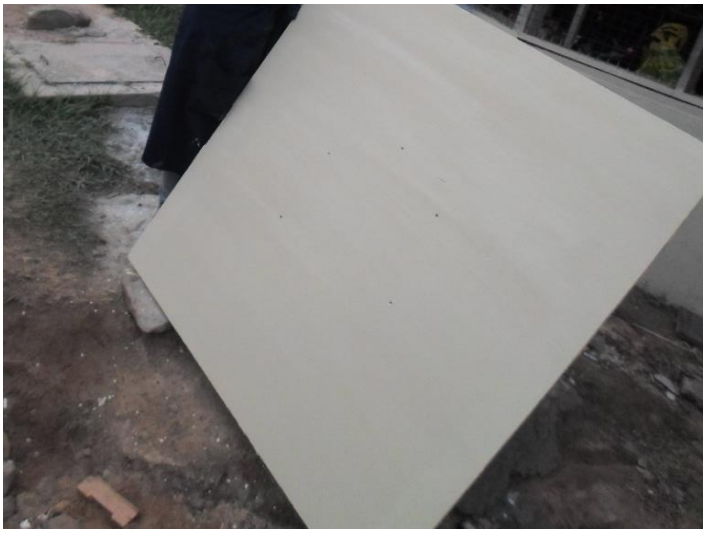

Fig 34:- Finished board ready for mounting.

Fig 36:- The finished logo mounted on the mock wall

ISSN No:-2456-2165

III. DISCUSSION

Three main techniques were employed for this project: Piercing, Cold Chiselling and Sawing. Due to the purposeful material selection arc welding was enough to establish the needed permanent joints. The flat members of the logo give it a sharp appearance. It enhances its beauty by giving it a very shrill but intricate and attractive look. Test assembling of such a logo on a higher ground (such as a table) may appear in imbalanced though it may be balanced. Auto based paint provides an exquisite matte finish: This paint is essential for outdoor metal ware since it is enamel-based and can withstand atmospheric conditions. The overall result appears very sharp both from near and far.

IV. CONCLUSION

Like in the working process, forming techniques in general do not stand in isolation especially when different shapes and forms are involved. However, two important conclusions are made. A combination of metal forming techniques is the surest approach to problem solving activities in metal. Secondly, explicit results in metal are not how many techniques one knows but how well the known techniques could be handled or applied.

RECOMMENDATION

Components of wall logos should be test assembled on the ground to ensure balance in order to obtain poise and steadiness. Moreover, the members of the logo must be assembled below eye level. This will give a guarantee that all the sides are seen well. One must always consider the weight of a product, the wall for the mounting and the connectors before mounting. These three main considerations must be made when mounting this logo to prevent accident that can cause injury or wasting of the final work. The fasteners that were used in this project were normal spokes made from ¾ inch iron rods. The researcher recommends that bolts and nuts be used in place of the ¾ inch iron rods if a similar project is undergone. This will aid mounting on other surfaces like wood, stone, alucobond and slippery supports like glass and Perspex to give a firmer hold. Finally, the researcher recommends that further experiment on this project, more importantly, with the logos of the other colleges in the university.

REFERENCES

[1]. *Farrow & Ball.com*. (2013, May 25). Retrieved from Choosing Finishes: http://www.farrow-ball.com/exterior-woodwork-metal/content/fcp-content

[2]. Howard, M. (2013, May 25). *How to Cut Metal* . Retrieved from www.ehow.com: http://www.ehow.com/how_5566754_cut-metal-bandsaw.html

[3]. Kang, D. (2013, April 2). *Logo Designer.* Retrieved from mymarkets: www.mymarkets.com/lm/01htm

[4]. Kwambenya, O.-B. (2005, 2008, 2012). *Three-dimensional Artfoms.* University of Education, Winneba: Kwambenya Ofori- Boakye.

[5]. Logobee.com. (2013, April 02). *Logo Design.* Retrieved from logobee.com: www.logobee.com/feature3.htm

[6]. McAdams, D. (2013, April 02). *what makes a good logo.* Retrieved from Marketstorm: http://www.marketstorm.co.nz/article_logo.htm

[7]. Olexa, P. (2011, May 27). *Discovering 3D logo designs.* Retrieved from Cruzine: www.cruzine.com/.../3d-shapes-logos/

[8]. Pate, E. (2013, May 25). *Decorative Metal Finishing Techniques.* Retrieved from www.ehow.com: http://www.ehow.com/info_8541167_decorative-metal-finishing-techniques.html

[9]. SCOTT, D. (2013). *MECHANICAL PROPERTIES OF MILD STEEL*. Retrieved APRIL 18, 2013, from EHOW WEBSITE: http://www.ehow.com/list_6618717_mechanical-properties-mild-steel.html

[10]. Smith, S. (2013, May 25). *About Cold Chisels.* Retrieved from www.ehow.com: http://www.ehow.com/about_4685898_cold-chisels.html